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PETROLEUM.

PETROLEUM AS FUEL.

GENTLEMEN:—

By your direction experiments have been in progress for some months having in view the elucidation of the principles and methods used by Mr. Simon Stevens for burning petroleum and other hydro-carbons in combination with jets of steam, which method, and the apparatus used, form the basis of the various patents held by your Company in this country and in England.

The difficulty hitherto has been in attempting to burn the crude petroleum, that the imperfect combustion alone attainable by the means in use, has resulted in great waste of the material, as shown by the dense smoke which invariably accompanied all attempts to burn it in a confined space. This, and the difficulty of regulating the feed, have hitherto prevented a successful application of this material as a fuel in the generation of steam in boilers. I am well aware that it has occasionally been accomplished on a small scale, but no experiments that I have knowledge of, have exhibited anything like the requisite command of the material in feeding the fire, or certainty in its use as a fuel. This remark is made in full knowledge of what has been accomplished in this direction by Messrs. Linton & Shaw, as well as by Mr. Richardson in England. This difficulty has, I think, been successfully overcome in the experiments conducted for your Company, and the crude Petroleum, without other fuel than the chips for kindling the fires, has been burnt daily under a marine boiler, in a course of experiments extending from the month of May last, and proves more manageable, more under the control of the fireman, and develops an amount of heat greater than any fuel with which we are acquainted.

Mr. George W. Quintard, of the Morgan Iron Works, having offered us the use of a Marine Boiler for our experiments, we applied our apparatus to it, without regard to any disproportion which might exist between the two; further experiments being needed in order to determine their precise relative dimensions. The experiments thus far have not extended beyond the determination of the fact that Petroleum may be used with great facility as a fuel under steam boilers, by a single fireman of ordinary intelligence. No minute analysis has been made of its comparative economy—the results thus far being regarded as merely general; but from the results herewith shown, you will be enabled to determine how far our experiments sustain the claim we have advanced of having successfully applied this material to steam boilers.

The boiler used was an internal flue and return fire-tube boiler, the shell measuring thirteen feet and nine inches in length, by six feet in diameter, with a grate-surface of thirty-five square feet; contents about fifteen hundred gallons of water to the level of six inches above the upper line of tubes. There were three flues in the boiler, the centre one, P, of 16 inches diameter, and the other two, R, of 12 inches diameter. The boiler was not set as represented in figures 1, 2 and 3, which is the method recommended; but rested merely on three walls of the dimensions of the furnace walls. There were five rows of 2½ inch fire-tubes, as shown in figure 2, being 75 tubes in all; the back connection being 15 inches by 3 feet 5 inches, and the smoke stack 30 inches in diameter. The boiler was unclothed. Fig. 1 represents the plan of the furnace, showing the arrangements of the Retort or Mixer, and the oil and steam-tubes. Figure 2 is a cross section of the boiler through the furnace, and figure 3 is a longitudinal section through the centre of the boiler and furnace. The same letters refer to the same parts in the several figures.

The fire bars were removed, and in their place a coil of three-quarter inch wrough iron pipe, A, was inserted, the total length of pipe in the coil being twenty-three feet; at the back, directly across the furnace, a wrought iron tube, B, or retort, five inches in diameter, and closed at both ends, was placed, with a short tube, C, of two inches diameter immediately in front of it. Into this latter tube (which communicates with the retort) one end of the coil is inserted, and the other end, D, passing out of the furnace door, communicates with the reservoir of oil, being in this case the cask in which it was brought to market. The flow of oil is regulated by a stop-cock, M, placed near the furnace door. Some eight inches under the coil of pipe lie ten one-inch wrought iron tubes, N, closed at one end, the other end inserted into the retort; these tubes lie parallel to each other, and are two feet three inches in length, and into each of them is tapped nine cast iron burners, F, with one-sixteenth inch opening, making in all ninety burners. An inch above the plane of the coil, a wrought iron pipe, G, proceeds direct from the coil, a wrought iron pipe, G, proceeds direct from the short tube in front of the retort into which the coil is inserted, to the furnace door, and thence to the steam space of a small auxiliary boiler; a branch, with proper valves, K, connects this pipe with the steam space of the main boiler—the flow of steam being also regulated by a stop cock, H, placed in the vicinity of the furnace door, near the oil cock.

The water in the boiler being cold (sixty degrees), at fifteen minutes past two P. M., some billets of pine wood and shavings, weighing about twelve pounds, being placed upon the coil, near the furnace door, were lighted and the door partially closed; after an interval of fifteen minutes the oil cock, M, was gradually opened, which permitted a flow of oil from the reservoir through the coil; simultaneous with which, or a little later the steam cock, H, was opened, which conveyed

REFERENCES.

A. Coil of Pipe from the Oil Reservoir.
B. Retort or Mixer.
C. Short Connecting Pipe.
D. Pipe leading to Oil Reservoir.
F. Burners, 90 in number, 1-16th inch each.
G. Steam Pipe.
K & H. Steam Valves.
M. Oil Valve.
N. Tubes into which are screwed the Burners.
P. Large Flue of Boiler.
R R. Smaller Flues of Boiler.

Fig. 1.

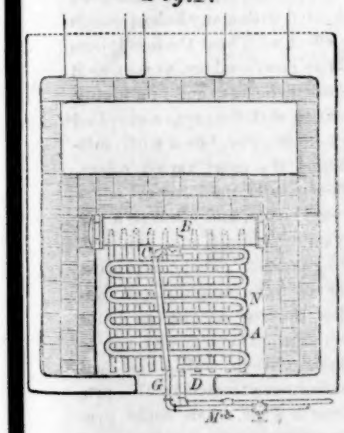


Fig. 2

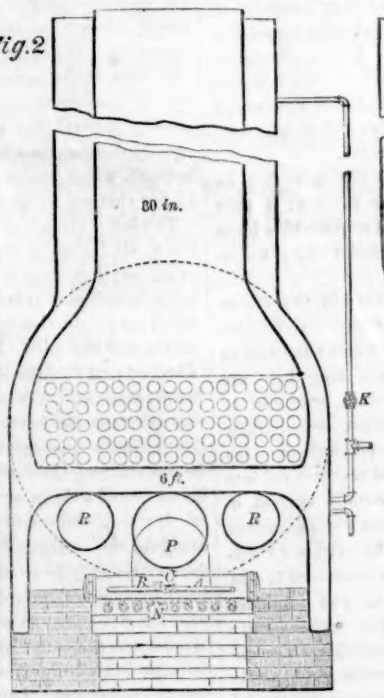
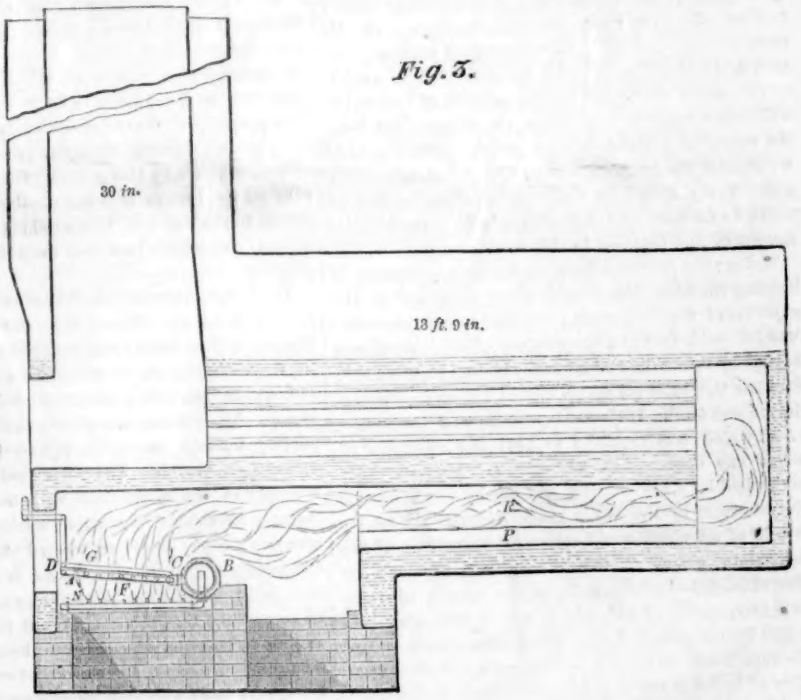


Fig. 3.



steam of about twenty pounds pressure from the auxiliary boiler, through the heated steam pipe, G, above the coil, to the retort or mixer, B, where combining the vapor of oil from the coil, it passes into the straight pipes, N, under the coil, and is fired at the burners, F. The flame was vivid and intense, regulated in its force by the relative flow of oil and steam, and was entirely under the control of the fireman, who, at his pleasure, could reduce the flame to the flicker of an expiring lamp, or extend it by a single movement to a volume filling the large flues and furnace with its flame. No smoke or unpleasant smell was perceptible, and the combustion was complete and entirely manageable. Steam, at atmospheric pressure, was raised in the boiler in twenty-nine minutes from the time of admission of oil into the coil. No measure was taken in this experiment of the amount of water evaporated the apparatus not being considered as properly proportioned to exhibit the economical value of the fuel, and the experiment terminated in about one hour by closing the oil cock, M—and the fire was out.

The analysis of this experiment may be shown as follows: As this experiment only exhibited the weight of oil which, consumed under the boiler, raised a given quantity of water from a temperature of 60° to the boiling point, it is requisite for a comparison with the known effects of anthracite coal, to show the proportionate amount of oil which would be necessary to convert this same bulk of water into steam of the atmospheric pressure, or the weight of water which a pound of this fuel will convert into steam.

According to Tredgold, the quantity of fuel which will convert a cubic foot of water, of a given temperature, into steam, at the pressure of the atmosphere, is obtained by multiplying the quantity of fuel which will heat a cubic foot of water one degree, by the sum of the latent heat of steam, and the difference between 212° and the given temperature of the water. In this case, 212°—60°—152°. The latent heat of steam, according to Dr. Ure, is 967°, which added to 152°—1,119°, which multiplied by the quantity of fuel which will heat a cubic foot of water one degree, will give the weight of fuel requisite to convert a cubic foot of water from the temperature of 60° into steam. This product multiplied by the number of cubic feet of water to be converted into steam, will give the total amount of fuel required in this case.

Making the proper allowance for the pine wood in lighting the fires, the weight of oil consumed in the experiment was 60 pounds; the contents of the boiler was 200 cubic feet at a temperature of 60°, which was heated by this weight of oil to the boiling point—212°; thus the weight of oil which heated 200 cubic feet one degree was 60 lbs. 152°—0·39 pounds; and the weight of oil which was requisite to heat one cubic foot of water one degree was 39·200—0019 pounds. This multiplied by 1,119°—2·126, and this by the 200 cubic feet of water in the boiler gives 425 pounds as the weight of oil which would convert the contents of the boiler into steam at the atmospheric pressure—or 200x62·34-425—29·33 pounds, as the weight of water at a temperature of 60°, which will be converted into steam by one pound of oil. From Isherwood's valuable experiment on marine boilers,—we find this same type of boiler in use on board one of the U. S. Steamers, and from the mean of the experiments conducted on these boilers, we find the quantity of water evaporated from a temperature of 100° with steam at the pressure of the atmosphere by one pound of Anthracite coal, to be 8·5 pounds. To compare this with the evaporation made from a lower temperature of water by means of the oil, this weight must be reduced in the following ratio, established by Isherwood: 966°-900°x112°x152°—1078-1118—0·964, which multiplied by 8·5, gives 8·16 as the weight of water at 60°, converted into steam of atmospheric pressure by one pound of Anthracite coal.

Comparing this result with that above shown for the product of the combustion of oil, we find the evaporating power of the two fuels to be in favor of the oil, in the ratio of 29·33 to 8·16, or 3·6, weight for weight; the coal and the oil occupying about the same space for a given weight. That is to say, a cubic foot of coal as stowed aboard ship, will weigh about the same, or a little less, than a cubic foot of oil, the first weighing from 43 to 52 pounds, and the latter about 54 pounds to the cubic foot.

Further experiments, with improved apparatus, will be necessary in order to determine the precise economic value of this fuel in comparison with coal, but the advantages of the oil as a fuel for marine engines may be briefly summed up as follows:

Rapidity with which steam may be raised—reduced dimensions of boiler and furnace below that required for coal—the continuous firing effected by feeding the fuel through a pipe into the furnace, thereby preventing the great loss of heat in the furnace every time a fresh supply of coal is thrown on, and the rush of cold air upon the opening of the furnace doors—the freedom from smoke, cinder, ash, or refuse of any kind, which in coal reaches from seven to over sixteen per cent. of the whole amount. In the ability to command a forced fire almost instantly, without a forced draught, which, under some circumstances at sea, is of vital importance. In dispensing with the numerous class of coal heavers, stokers, &c. and all the inconvenience of raising clinkers and ash from the furnace rooms; and finally the diminished space occupied in the storage of the fuel.

Respectfully submitted

JULIUS W. ADAMS,
Engineer.

MINING.

DIFFERENT IMPROVED PROCESSES FOR WORKING GOLD ORES,

NOW BEING INTRODUCED INTO COLORADO.

We publish the following interesting accounts of different desulphurizing processes, taken by permission from the prospectus of the Amala Mining Company, 23 Nassau Street, New York, which had them compiled especially with reference to their valuable and extensive property in Clear Creek County, Colorado.

LYON'S SMELTING PROCESS.

To work ores by this process, the ore must first be crushed by stamps or some similar process; it then passes to the buddle. This machine consists of a large circular vat, about two feet deep and twenty feet in diameter.

The bottom is smooth, and is elevated in the centre a few inches higher than at the outer edge. Over this bottom, or floor, four arms revolving about the axis in the centre of the vat, to which tufts of long hair are attached at intervals of about two inches, are made to sweep. These preserve a smooth surface, and, carefully stirring the ores, cause the lighter portions to wash away to the outside. The pulverized ores are fed into a hopper at the centre, and with them a current of water is admitted. The water washes the pulverized ores down from the centre toward the outside or circumference. The galena, if any is contained in the ores, is left around the centre or axis. The sulphides of copper and iron come next, and the white quartz and sandy portions are carried to the outside. The galena contains most of the silver and some gold, while the copper and iron sulphides contain some silver and nearly all the gold, and the silicious or sandy portion outside contains so little of either that it is cast aside as worthless. In this way one-half the bulk of the crushed ore is removed, and at the same time at least ninety-five per cent. of the gold and silver retained. Between the pure sulphides and pure sand is a portion containing both, which is thrown aside to be run through again. By this means the ores are very perfectly separated.

That portion composed of galena, if any such there may be, may then be smelted in Scotch hearths. These consist of a cast-iron vessel, similar to a cauldron kettle, with an aperture for discharging the metal. Over this a cupola is erected.

The method of using a Scotch hearth is this: If the ores are a native galena, they are first broken to the size of a walnut, or in case of mixed ores, they are taken from the buddle and remainat the smelting: a quantity of old iron is thrown in to absorb it. The gold and silver contained in the bars of lead are then separated by cupellation.

The furnace consists of a concave iron hearth, lined to the depth of several inches with bone ashes wet up with water. These bone ashes are prepared by burning bones until they become perfectly white, and then grinding them to flour. Upon this hearth the lead is placed and a fire is lighted in the furnace below and around the hearth, and a blast is applied. A portion of the lead is converted into litharge on the surface of the melted metal, and is blown off into a chamber prepared to receive it. Another portion is absorbed by the bone ashes and carries with it any copper or other base metal which may remain. When all the lead is driven off in this way, the remaining metal suddenly brightens and the work is done. What remains is gold and silver.

The bone ash is afterwards smelted for the lead it contains, and is ready for use again. The loss of lead is about five per cent. each time it is used, and will not be greater, provided the furnace is properly arranged.

CROSBY AND THOMPSON'S

METHOD OF DESULPHURIZATION.

The ore is first crushed, dry, by stamps, and then fed by a continuous stream into a large revolving cylinder made of strong sheet iron. This revolves above and between two other revolving cylinders of the same size, all of which are heated by fire beneath.

The upper cylinder being further removed from the fire beneath the two lower cylinders, (the whole number being confined in a brick-work,) is not hot enough to dissipate the sulphur contained in the powdered ore, but is sufficient, it is claimed, to throw off the arsenic and antimony, and whatever quicksilver the ore may retain, when it consists of old tailings from stamp and pan mills. The cylinders are not quite horizontal, being depressed at one end sufficient to make the whole time of passage through about thirteen minutes. After passing through the upper cylinder, the ore passes, equally divided, in a hot state, into the two cylinders beneath, which, being in contact with the fire, are much higher charged with heat than the upper one.

The lower cylinders revolve upon hollow axles, some five or six inches in diameter, open at both ends. The axles, as they pass through the centres of the two lower cylinders, are perforated with many holes through which air is supplied to effect with heat the desulphurization and oxidation. The powdered ore, as soon as it is introduced into the lower cylinders, and in a highly heated state, comes in contact with the oxygen supplied through the holes in the hollow axles, burns with brilliant scintillations, exhibiting the most varied colors. Before reaching the further ends of the lower cylinders it has ceased to burn or emit colors, and forms in a vessel beneath, thoroughly desulphurized and oxidized, ready for the amalgamating process. That this process does thoroughly free the ore from sulphur and destroy the original nature of the iron, no one can doubt who has witnessed its working. The difficulty now to overcome is the one of amalgamation. Still a vast deal more gold can be secured from ore treated by this process in Freiberg or Hepworth Pans, than could previously be obtained in the same pans from raw ore.

A spray chamber, so called, is connected with the cylinders, through which the strong draft from the cylinders passes. This chamber is supplied by a flow of water which percolates through the upper surface, cooling the heated air and condensing the finer particles of gold, which otherwise would pass out the chimney. Large results are claimed from this addition, and possibly the amount may be equal to five or ten per cent. of the whole.

MASON'S PROCESS.

OWNED BY THE UNITED STATES MINING AND ORE DECOMPOSING COMPANY.

Mason's process for disintegrating and desulphurizing ores consists in introducing superheated steam into a fire, in such a manner that in a gaseous form the steam strikes upon the ignited coals or wood without admix-

ture of atmospheric air, and thus effects the decomposition of water into oxygen and hydrogen gases.

The oxygen unites immediately with the carbon of the burning coals or wood, while the liberated hydrogen passes from the fire and burns in the presence of the oxygen of the air.

The hydrogen flame and the resulting gases being brought into contact with the heated gold and silver ores, the sulphur, arsenic, &c., are dissolved, and are carried off with the products of combustion. The powerful effect of the flame of hydrogen in dissolving pyritous sulphur, arsenic, antimony, &c., and in attacking oxygen, is well known; but the expense of producing it has hitherto prevented its application to the disintegrating and desulphurization of gold and silver.

Not until this cheap invention and simple method of decomposing water, and thus furnishing hydrogen gas and flame abundantly, has it been at all possible to apply it to this purpose. Furnaces are now operating by this process in California, which receive charges of sixty tons and are eminently successful. It is claimed that by this process, in Colorado, $100 per ton have been obtained, and from ore which yielded but $4 per ton in a stamp and pan mill. Extensive works are being built to demonstrate this process, under the direction of Mr. Kenyon, who claims that he will save 95 per cent. of the gold and silver contained in the ores, as proven by assay, and that he will sell the process subject to such guarantee.

THE COLORADO GOLD AND SILVER ORE SEPARATING COMPANY.

This Company uses the process discovered by Dr. William E. Hagan, for disintegrating rock and removing the sulphur and other mineral impurities which prevent the perfect separating of the precious metals, by the application of superheated steam.

The ores thus treated become soft and friable, and their character will be radically changed, so that they will crumble into powder under slight pressure, the sulphurets of iron, copper and other base mineral compounds will be converted into oxides. The finest particles of metallic gold will be liberated from their inclosing matrix, and the silver ore will be put in a chemical condition suitable for perfect amalgamation, so that both the silver and gold may be easily separated, without the great waste and losses attending the old methods of working the ores.

MESSRS. KEITH, BEHR & KEITH.

Their process is carried out on a large scale, as follows: In a properly constructed furnace a flame is created, either from wood, coal, or other combustible material, and the finely divided or pulverized ore is blown into the flame by means of a fan or other blower. each particle of ore is immediately melted, and obeying the law of gravitation, assumes a spherical shape, with the gold contained therein in the centre; the melted particles pass through the flue, the oxydizable portions thereof absorb oxygen from the air, which is freely admitted, and are deposited in the collecting chambers of the furnace. It will be seen that as the ore is introduced directly into the flame, and is subject to its action and that of the atmosphere while in a finely powdered condition, and perfectly diffused and suspended therein, it has a much greater surface exposed to the joint action of heat and oxygen then can be secured in any other way.

In this way the ore becomes fuel itself, and perfect oxydation and calcination is secured, with a decided economy in labor and fuel. And further, the ore is delivered from the furnace in a pulverized condition. All particles of gold and silver therein will be found in a globular form and perfectly free from volatile and oxidizable metals and minerals which impede amalgamation.

THE CHEMICAL GOLD AND SILVER ORE REDUCING COMPANY

The patents owned by this Company cover an effectual process for the disintegration of rock and ores, and the desulphurization of the same by the application of liquid and liquid solutions to them while in a heated state. By this means the rock or ore becomes desulphurized, and is rendered soft and friable, so that it may be easily reduced to powder. At the same time the volatile metals are expelled, and the base metals oxydized. This leaves the silver and gold free for amalgamation, and enables the miner to obtain almost the whole instead of less than one half of what his ores contain.

LETTER FROM SIDNEY ASHMORE, ESQ.

The system of extracting gold and silver known in Colorado as the Lyon process is, that of smelting the ores which are sulphurets of iron and copper in connection with galena, or with the oxides of lead—the principle being that the precious metals having a greater affinity for lead than for either iron or copper, leave these latter metals and combine with the lead, which is drawn from the furnace in a metallic shape.

The metallic or pig lead is then separated from the bullion by oxydizing the former in what is known as a Cupel furnace, the operation being that the lead passes off as litharge, leaving the bullion clear and pure in the bottom of the Cupel.

This is a fire assay on a large scale; by this process 95 per cent. of the bullion is taken out, when a good and clean slag is obtained; but for all practical purposes 85 or 90 per cent, is a good result, the amount of success depending upon the scientific handling of the ore in the furnace, and the proper use of fluxes.

The apparatus necessary, is the ordinary reverberatory furnace for smelting the ores, and the Cupel furnace for separating the bullion from the metallic lead

There are various other claims for disintegrating and desulphurizing the ores of the precious metals, but all tend to show that the most refractory ores can be treated with success so as to obtain the whole or nearly all the gold and silver they contain, and on a scale of sufficient magnitude for profitable and economical results at the mines, with ordinary skill and experience.

IMPROVEMENT IN ROASTING AND DESULPHURIZING ORES AND MINERALS BY THE USE OF PETROLEUM, OR OTHER HYDRO CARBONS, AS FUEL.

Extracts from U. S. Patent, issued June 7, 1864, No. 43,046, owned by the Petroleum Light Company of New York.

"The nature of my invention consists, first, in using hydro-carbon vapors or gases as fuel for roasting and desulphurizing ores. It consists, secondly, in effecting the roasting and desulphurizing of ores by burning the vapors of hydro-carbons mixed or combined with either ordinary or superheated heat And it consists, thirdly, in collecting from pyritous ores the gold and silver which they contain, by roasting or burning such ores in the flame from hydro-carbon vapors or gases, quenching the hot ore in water, then washing out and floating away the light earthy matters, and collecting the gold and silver by means of amalgamation with mercury, or on amalgamated plates—these several operations forming a continued process.

"The ordinary mode of roasting ores is in heaps, mounds, ovens, or furnaces, using solid fuel, such as wood, coal, coke, or peat. For fuel I use volatile hydro carbons, such as petroloum, coal oil, earth oil, or equivalent substances, which may be easily converted into vapor by heat. By the combustion of such vapor, mingled with air and steam, I effect the roasting and desulphurizing of ores and minerals, and in the case of the ores of the precious metals, the roasting, washing, and amalgamating may be united so as to form one continuous process.

"I will now proceed to indicate the operations and apparatus necessary for carrying my invention into effect. But as these may be greatly varied, and do not form part of this invention, a brief description is deemed sufficient. For converting the liquid hydro-carbon into vapor or gas, any of the known devices for that purpose may be used. It is not necessary, or even preferable, to subject the liquid to destructive distillation, so as to produce a permanent gas. The petroleum, or liquid hydro-carbon, is placed in a tank or reservoir, and by means of a tube conductor to a boiler or vessel to which heat may be applied, so as to convert the liquid into vapor or gas. This vapor may be mixed with air as it is produced, or the air may be caused to mingle with it at the instant of combustion. Steam, common or superheated, may also be mixed with it in like manner, so as to regulate the combustion and assist in roasting and desulphurizing the ores.

"The combustion of vapors thus prepared is effected by devices already known, and therefore need not be particularly described. The jets or burners used for delivering the vapor, air, and steam should be arranged in a row or series, so as to furnish the amount of heat required. The number of jets will depend upon the size of the furnace employed and the degree of heat necessary for effecting the roasting of the ore. By varying the relative proportions of hydro-carbon vapor, air, and steam, both the temperature and quality of the flame produced is always under the control of the workman.

"The hydro-carbon vapor, mixed with the proper amount of air for combustion, being supplied in a series of jets, as already pointed out, the next thing is to bring the flame from such jets or the hot products of combustion, in contact with the ore to be roasted. This may be done in many ways. The simplest is to place the pulverized ore on the hearth of an oven, or in a reverberatory furnace, so that the flame and heated gases may play upon it. Or the ore may be broken into small pieces and placed in a revolving cylinder, such as is sometimes used for distilling coal, and the flame thrown through the cylinder as it revolves. The axis of the cylinder may be inclined, so as to cause the ore to pass through it as it is revolved. Other means may be used to move or stir the ore as it passes through the cylinder.

"Another, and in many respects a preferable mode of effecting the roasting of the ore, is to bring it in fine powder into the flame. This may be accomplished by having the ore fed from a hopper, so as to fall into the flame from the row of gas or vapor burners, or by driving the ore into the flame with an air blast. Or the combustion may be carried on in an upright shaft or chimney, the gas or vapor jets being arranged in rows on one, two, or more sides of the shaft, either at the top or bottom of it. Or when it is necessary to bring a large volume of flame in contact with the ore, several parallel rows of jets may be arranged at different heights on the inside of the shaft. The ore, in fine powder, is to be fed into the top of the shaft or chimney, and as it falls it will be completely roasted by the flame or hot gases and vapors. Steam or superheated steam may be ejected through the jets which convey the hydro carbon vapors. Air also, for supporting combustion, may be mingled with oil vapor, or it may be introduced through separate pipes.

"When ores of the precious metals, as pyrites containing gold, are roasted by my process, the entire operation of roasting washing, and amalgamating the gold may be carried on in a continuous manner. As the ore is roasted, it should fall into water, where by stirring and agitating it is washed, and the light earthy matters carried off by a current of water. The heavier parts, containing the gold and silver, will settle to the bottom, and may be combined with mercury, or collected on amalgamated plates, in any of the usual modes well known to miners and metallurgists. As the hot ore falls directly into the water, the latter will be kept at a high temperature, and therefore the amalgamation of the precious metals will be readily effected.

Having thus described my invention, and the several modes in which it may be applied, what I claim and desire to secure by letters-patent of the United States is:—

1st. The use of hydro-carbon vapors or gases as fuel in the roasting and desulphurizing of ores or minerals.

2d. The desulphurizing and roasting of ores by means of a combined blast or current of hydro carbon vapor, air, and steam, applied in the manner substancially herein set forth.

3d. The process herein described of separating and collecting the precious metals from pyritous ores, which process consists in roasting and desulphurizing the ore, receiving it while hot in water, washing and removing the light earthy matters, and amalgamating the precious metals, these several operations forming a continuous process, as above set forth.

GAS.

ORIGIN OF CLAY RETORTS.

From a French Point of View.

The first idea of replacing cast iron, by fire clay retorts, for the distillation of illuminating gas, is due to Mr. Grafton, an English Engineer, who made the first trial with them at the Gas Works of Pasay, (Paris), in the month of April 1825. The Retorts were then made in pieces, (50 pieces forming a retort), and put together in benches at the Gas Works. The joints, incompletely closed, required the use of an exhauster, but still for the same reason of non-hermeticity of joints, the gas generated in such retorts was mixed with a great quantity of atmospheric air decreasing its illuminating power to such a degree as to preclude any further use of clay retorts put up in the style of fractional pieces invented by Mr. Grafton. However, the idea being once started, many attempts were made in England, which, on account of their want of success were never mentioned.

Only ten years after Mr. Grafton's trial and failure, Messrs. Wilson & Manby, then proprietors of the Gas Works of Monceaus, Paris, established a shop at the works, for the purpose of manufacturing clay retorts. They turned them out in four sections, still putting them together in the benches. In 1837 the same company succeeded in manufacturing retorts in one piece.

By this last mode, the joints disappeared, but the retorts cracked (for reasons well known to day by competant manufacturers), and leaked so badly that they could not be of any practical use, presenting no economy over cast-iron retorts.

In 1838, Messrs. Wilson & Manby, sold this manufactory to Mr. Bona, who, notwithstanding the general failure of his retorts, accumulated a fortune by selling them all over the continent of Europe, in small lots, to be used as trials.

About the same time, the firm of Joseph Cowen, of Newcastle-on-Tyne, England, put up a clay retort manufactory on a large scale. The retorts of this firm have been used all over the universe, but they never have proved to be what is called an entire success. This firm has, however, maintained itself up to the present day, and is the most important manufactory in Great Britain.

Following the example of England, which in part adopted the use of clay retorts, a company in Paris, called "Cie Francaise Pilte Larrien Bromton & Cie," was formed and clay retort works put up in the Gas Works of Vaugirard, Paris. The engineer of the Gas Works, Mr. Meynal, made arrangements with Mr. Joseph Beanfay, then the most celebrated crucible manufacturer in the capital, and on the first of March, 1840, Mr. Beafay with his foreman, Mr. H. Champanois, commenced work and produced retorts of a quality greatly superior to all those manufactured up to that time. However, the retorts did not all succeed in the first baking; moreover they cracked more or less in the Benches, and it was found impossible to set them up in direct contact with the flame. Therefore the benefits and advantages expected from them, were purely illusory.

In England, things loooked the same if not worse. It is true that clay retorts were more freely used, as fuel in England is abundant and very cheap. Gas Engineers of those days did not care much for leakages in the use of clay retorts, as they asserted that the combustion of the escaping gases contributed materially towards heating up their retorts.

In 1844, a firm started in Belgium, which delegated an Engineer to go to Vaugirard, to study and learn the process of manufacturing clay retorts. Four retort works sprung up suddenly in that country, of which the most important are the works of Mr. Albert Keller, in Ghent. All these facts did not give more favorable results in the use of clay retorts, which were unaltered up to 1852.

The principal cause of this state of stagnation in successful working the clay retorts, was due to the absolute want of knowledge of the ceramical art, by those men who then attempted to manufacture them. The only man at that time capable of solving this question. Mr. Beanfay, died suddenly in 1844; the task was therefore left to his pupil and successor, H. Champenois, to solve the difficult question. All the countries abounding with fire clay were visited, assays and analyses made of all the clays known. While the investigations were going on, England and Belgium were the only counties left, continuing the use of clay retorts, and there only in some of the large works. In France and other countries, where bituminous coal is very dear, they had all renounced the use of clay retorts, returning to cast-iron. When in 1852 all the industrial papers published to the gas works at large, that the problem of manufacturing clay retorts had been solved, that the retorts turned out by the works of Rive de Gier, by H. Champenois, were not only free from loss of gases, but could be set up in benches without any other support but front and rear walls, that they could be let down and refired without doing them injury, that the gases distilled in them are of an increased illuminating power, the yields more remunerative. and last and not least, that these retorts could be worked without the use of any Exhauster. The works of Rive de Gier, were soon too small to supply the increasing demands for clay retorts. The firm Bousquet, Champenois & Co., was then established at Lyons, which manufactory took the lead and acquired a reputation which is not equalled on the continent.

Retorts of this last manufacture, were used by J. K. Brick, then Engineer of the Brooklyn Gas Works, and the results were such that in the commencement of 1858, Mr. J. K. Brick did not hesitate in making arrangements with Mr. H. Champenois for organizing the important Clay Retort Works situated near his Fire-brick works, on Red Hook Point, South Brooklyn. In organizing these works at his own risk, Mr. Brick gave proof of courage and resolution, as the verdict of men, seemingly most competent, was to the effect that the American clays were absolutely unfitted for the purpose of turning out clay retorts. The United States was thus relieved of the tribute they had to pay in importing this article. Succeeding him in the following order, were:

Mr. Headley, of Cleveland, Ohio.
Gautier & Co., of Jersey City.
B. Kreischer, of Staten Island.
Maurer & Weber, of N. Y. City.

COAL AS A SOURCE OF HEAT AND LIGHT.

Substance of a Lecture delivered in England, by Dr. Frankland, before the Royal School of Mines.

Looking at a coal fire from a strictly scientific point of view as a source of heat, the light and blaze which always accompany the combustion of coal can only be considered a great waste, for the heat produced thereby is but small, whilst the loss of illuminating power is great. Despite, however, our full appreciation of this fact, it is very doubtful whether we shall ever be able to devise a means of availing ourselves of the light produced in our household grates for illuminating purposes. Nevertheless, to the extraction of the blazing part of coal is due the chief improvements during the last century in the manufacture of artificial light. We are all familliar with the blaze which accompanies the throwing of coal on a bright fire. Let us, then, examine what takes place in the production of this light; and for the purpose of discovering what produces the light, let us heat some coal in a closed copper flask, communicating by means of a pipe with a retort. As the heat is applied to such a flask, we shall find that two distinct sets of substances pass over into the retort, the one vapours the other gases. The latter of these, the gases, are what we apply for the manufacture of artificial light, so we will for the present confine ourselves to them deferring the examination of the vapours until the next lecture. If we cool the mixture of gases and vapours which collect in the retort attached to the copper flask, we shall find a separation takes place between the two sets of bodies, the vapours under such conditions condensing to liquids, the gases remaining as such. Now, the gases thus separating cannot be directly applied to the production of artificial light, for they must be first submitted to a process of purification, being contaminated with non-luminous substances. The chief of these deleterious ingredient of the crude gas are sulphuretted hydrogen and ammonia, with a small quantity of carbonic acid. The first, sulphuretted hydrogen, has a most fetid ordour, and when burnt gives a very bad smell, besides producing sulphurous acid gas, which it is most injurious to inhale. The second, ammonia, must also be got rid of. for its presence in the gas would materially diminish its illuminating powers; whilst the last, carbonic acid, is present in the mixture of crude gases only to so small an extent as not to be considered worth separating. The other two, however, it is necessary to get rid of, and their separation is effected by passing the crude gas as it escapes from the retort through rust of iron, which absorbs almost entire the whole of the sulphuretted hydrogen present, whilst the ammonia still remains in it. If, then, the gas, after passing through the rust of iron, is passed through water, the ammonia will be dissolved out by the water, and the gas which passes off will be in a condition to use for illuminating purposes.

On the large scale for lighting our streets and houses, coal gas is manufactured in the following manner: A number of D shaped iron retorts, some 8 to 10 feet long, are filled with coal, and arranged in a row in an oven. Being filled, these retorts are closed by plates screwed on to the openings, and an iron tube rises from the retort just behind the closing plate, which conducts away all the gases and vapours formed. Heat being applied to the retorts, the products of the combustion of the coal pass off through the pipes into a large horizontal pipe, called the hydraulic main. This hydraulic main is always kept half full of tar, and the ends of the pipes which conduct the gases into it dip a few inches into this tar, and thus whatever gas passes into the main is prevented from returning, under any circumstance, to the retorts whence it has come. Well, in this hydraulic main, as it is termed, the process of purification is begun, for in it the mixture of the gases and vapours are cooled, and the least volatile of them are deposited as liquids, which escape from the main through a pipe leading into tar barrels. The gas which escapes from the main is still very hot, and is, therefore, conducted into the condensers proper, which are nothing but a long set of pipes, kept cool on the outside by water. The gas, in traversing these tubes, is forced to keep on its course, by making at intervals boxes of water, into which the end of the pipe through which the gas is coming dips, so that the gas, having once passed through the water, and escaped into the box, has to pass on through the next tube leading out of it, not being able to return through that by which it entered. In this cooling through the tubes there is some water formed, and a good deal of tar liquid, which, passing into the boxes mentioned, is conducted from them into the tar wells. It has been attempted to cool the crude gas at once, by passing it through water, but this arrangement of the pipes has been found the most economical, as well as the most effectual for the purpose. The liquid that collects in the tar wells will consist of tar and ammoniacal liquors, the oily and heavy part being the tar, and the lighter compounds the ammoniacal liquors. In the passage of the gas through the tubes a little water will have been condensed, but

the quantity will not have been sufficient to absorb the whole of the ammonia present in the crude gas, therefore it is necessary to adopt a separate arrangement for its extraction. Now, this gas ammonia will neither burn itself nor support combustion, and the quantity of it present in the crude gas is so large that the manufacturer must separate it from his illuminating gas.

The manner in which the extraction of this ammonia is effected in the gasworks is the following:—The gas, as it escapes from the cooling tubes already described, in which the vapours it contained have been deposited, is conducted into what is termed a scrubber, which is nothing but a large iron vessel in the form of a column, filled with pieces of coke. Water is admitted at the top of this vessel, and is so dispersed on entering as to trickle through the whole mass of coke with which it is filled; and the gas entering at the bottom of the vessel, in its passage upwards through the coke meeting with the water which travels in the opposite direction, imparts to it the whole of its ammonia, water having an extraordinary power of absorbing large quantities of this gas. The presence of ammonia can always be tested by exposing to the air supposed to contain it, turmeric paper, when if there be but a trace of the gas there the paper will immediately become converted from a yellow colour to a dark brown. Supposing, now, that the gas which passes off from the scrubber has been purified from all traces of ammonia, and which will be the case if the arrangements are well conducted, there still remains in it that other most objectionable gas, sulphuretted hydrogen. Formerly the gas manufacturer effected the separation of this substance by passing the gas through layers of slaked lime, which possess the property of absorbing it freely; but, unfortunately, when saturated with this gas the lime gave such an intolerable smell that the great difficulty was to get it away from towns, the only plan known of effectually getting rid of it being by burying it. However, they had to use it until about ten years ago, when the discovery was made that rust of iron had exactly the same property of absorbing this sulphuretted hydrogen as the slaked lime, and with the enormous advantage that, whilst the slaked lime saturated with the gas became an offensive body, the rust when saturated gave no smell; and if, in its saturated condition, it was exposed to the action of the atmosphere for a short time, became converted back again into rust of iron, ready to be used for absorbing a fresh quantity of gas. In fact, this rust of iron seemed to have been made for the purpose. In practice the manufacturer places this rust of oxide of iron on trays, with false bottoms, and then leads the gas from the scrubber under the false bottoms of these trays, so as to make it travel upwards through the rust of iron; and there being several of these trays one above the other, the gas travels each in turn, until at last it has lost every trace of this most objectionable ingredient, and is fit for illuminating purposes. From the trays the gas passes into a metre, where it is measured, and it is thence conducted into the gas-holder, which is an immense cylindrical receiver, closed at the top, and suspended in tanks of water by chains, to which counterpoises are attached, so that the gas-holders rise and sink in the liquid as they become filled by the purifiers or emptied by the mains. Let us now, then, enquire what kind of substance is our purified gas. It consists, essentially, of several kinds of ingredients, which are hydro-carbon gas, fire-damp, hydrogen, carbonic oxide, and carbonic acid gases. Now, if we produce a jet of each of these substances and burn them, we shall find that most of them are but feeble illuminators, if possessing illuminating power at all. Carbonic acid we know is not combustible. Carbonic oxide burns with a pale blue light, and is valueless for illuminating. Hydrogen burns with a pale flame, which possesses no illuminating power The flame burning fire-damp is also but slightly luminous. The only remaining constituent—the hydro-carbon gas, or olifiant gas, as it is called—is, then, the one in which resides the whole illuminating force of our coal gas. If we prepare some of the olifiant gas pure we shall see with what an intensely white light it burns. Now, those flames which when in combustion do not deposit solid matter, are non-luminous, whilst those which deposit solid matter are, on the other hand, luminous. By this test let us examine the products of the combustion of the different ingredient gases of our coal gas. Carbonic oxide, when burnt produces a gas, carbonic acid. Hydrogen produces water. Fire-damp does not deposit any appreciable quantity of solid; but the olifiant gas, the only illuminating element of coal gas, deposits abundant quantities of carbon, and the luminosity of its flame is due to the high temperature to which the solid particles in it become heated.

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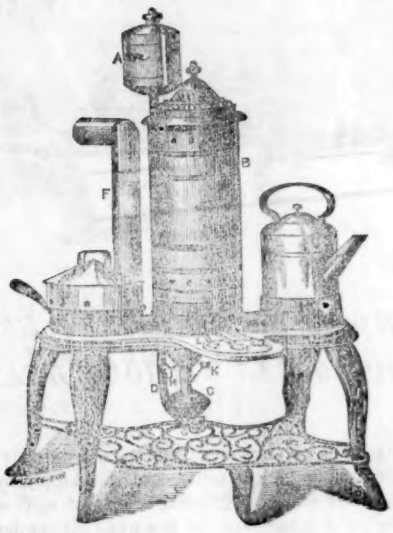

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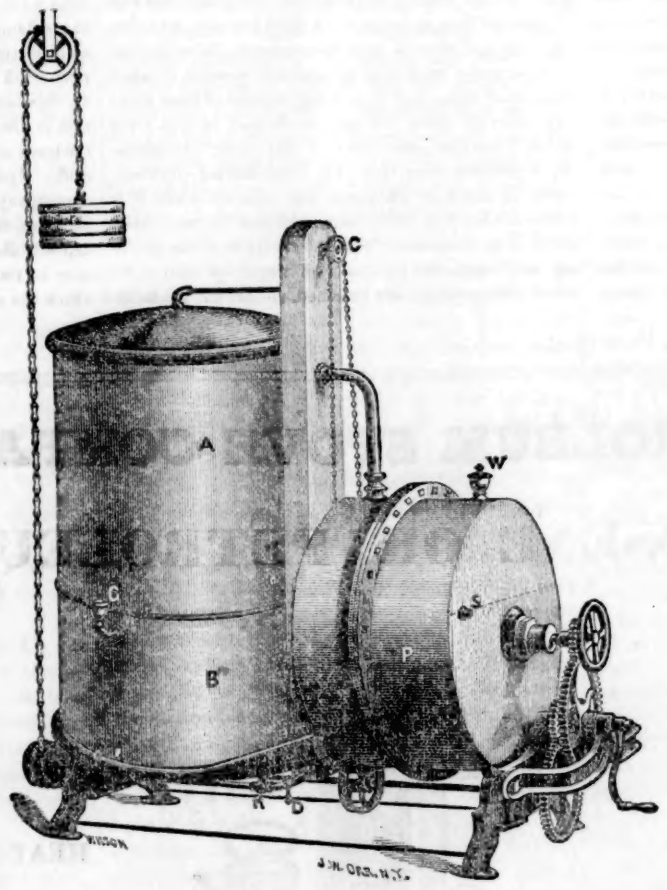

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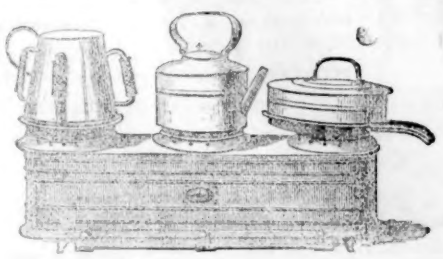

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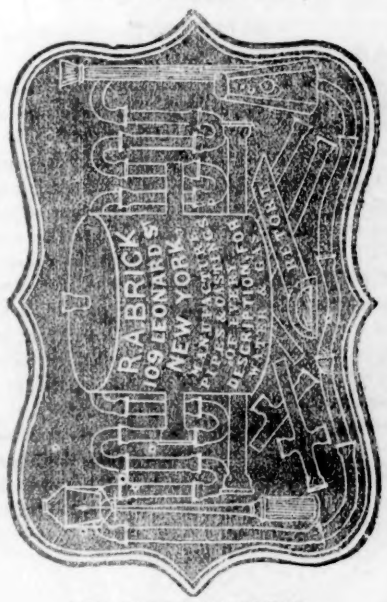

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AND

AMERICAN GAS-LIGHT JOURNAL,

PUBLISHED ON 2D AND 16TH OF EVERY MONTH.

JAMES W. BRYANT, EDITOR.

FRIDAY, FEB. 2, 1866.

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☞ *Agent's Office, No.* 1 *Spruce street.*

☞ Our subscribers would confer a favor upon us by remitting *checks, or Post Office Money orders*, as we are frequent losers by money sent by mail.

☞ We should be pleased to make our journal an organ of intelligent discussion for those of our subscribers and readers who may wish to gain, or give information on the subjects to which our columns are devoted. We solicit letters from those who make the study of gas a pleasure as well as a profession.

We republish the Origin of Clay Retorts, in consequence of the demands upon us for copies of our paper, having exhausted our last edition.

METRE RENT.

To the Editor of the *Gas Light Journal:*

I notice that a bill has been introduced into the Legislature of this State, to prohibit the charging of Metre rent by Gas Companies. I know nothing of the nature of the bill except its designation by the reports of bills introduced. It may be local or general, it matters not which, so far as this article is concerned. To any one unfamiliar with the supply of gas, the object of this bill would seem to be to protect the consumer against the grasping disposition of Gas Companies; but a moments reflection, with a moderate amount of common sense, will reveal the fact, that as a rule, it is of no consequence to Gas Companies, whether this bill becomes a law or not; but it is of vital importance to consumers, as I will attempt to show:

Some Gas Companies charge Metre rent to their consumers, while others do not; and I lay it down as a proposition, that a great injustice is done to consumers in any locality where Metre rent is not charged by Gas Companies to consumers using their metres.

First. It is regarded as a fact, that there is no commodity sold that is subjectod to as rigid tests to insure accurate measurement between producer and consumer, as the article of gas. Every metre used by any gas company in this State, is required to bear the stamp of a sworn Inspector of Metres, and such Inspector is appointed by the State authority, and whose salary is paid by a tax upon the different gas companies in the State. This has been done by Legislation to secure a uniform and perfect registry of all metres in use within the jurisdiction of the Legislature.

Secondly. Gas Companies, as well as all other incorporated bodies, require a sufficient amount of income from their investment, to pay dividends to their shareholders; and the efficiency of such companies depends upon their ability to pay to the shareholders, a fair return on such investments, and the varying prices charged by different gas companies, result from the difference of localities in regard to population—the economy of the original construction of their works—the expenses of running the same, and their proximity to a coal market. And all gas companies differ more or less in these particulars, but no difference of opinion exists between them in regard to charging a sufficient amount for the gas they furnish, as to enable them to make a fair dividend upon their investment.

Thirdly. Gas Metres are used for the mutual accommodation of manufacturer and consumer. Were it not for this correct standard of measurement between them, one or the other might be defrauded. In the measurement of all heavy or bulky articles brought to market, the cost of such measurement of quantity, is, as a rule, divided equally between the seller and purchaser. The merchant of course does not charge directly, for the use of his scales and measures to the consumers of his goods, but indirectly, as an expense incident to his business, together with his clerk hire and store rent, the consumer must pay in the price of his purchases.

Fourthly. If Gas Companies should, by law, be prohibited from charging Metre rent as such, they would be compelled to make up the amount in the price charged for gas, which would make their receipts the same, simply substituting the name of gas for Metre rent.

Fifthly. If Gas Companies should be prohibited from charging Metre rent, and they should increase the price of gas corresponding to their loss thereby, it would work an injustice between consumers. For instance, suppose A. consumes $20 worth of gas per month, which passes through a Metre on which he pays 10 cents. per month rent; B. consumes $5 worth per month, and pays ten cents. rent; A and B pay for the gas each consumes, and each pay equal amounts for the rental of their metres, which has cost the Company $15. Whereas if no metre rent is charged as such, and the aggregate amount of what was charged for metre rent be added to the price of gas, in that case, the large consumer would pay for the metre used by the smaller. To illustrate more fully, suppose the amount collected as Metre rent by any company is equivalent to 10 cents. on each 1000 feet of gas sold per month, and A. consumes 4000 feet, he would pay 40 cents. per month for his metre, while B. who consumes but 500 feet per month, pays only 5 cents. for his; thus A paying the rental of B, for no other reason than because he is the better customer of the company. The injustice of this is at once apparent to every one. Again, there are many consumers who do not use as much gas in three years, as others do in one month, hence these small consumers would pay little or nothing for the use of their metres, while the larger would pay the whole.

In all probability ½ of the capital stock of all Gas companies is absorbed in the metres they furnish for the use of their consumers, and of course this is a part of their capital, on which they expect a return, and it is immaterial so far as the Company is concerned, whether they get their return on this investment by charging rent as an item, or add the same amount to the price of gas; but it does make a material difference with the consumer. Hence I insist it is an act of injustice as between consumers not to charge Metre rent.

Lastly. Metres are perishable property, and they constitute one-eighth of the capital stock of Gas companies, their average duration in a perfect state not exceeding 5 or 6 years, subject to be totally destroyed by fire, not singly, but in quantities, (in populous cities) the rent charged requiring some 12 years to replace them; the constant expense attending their change and repairs, and no extra charge therefore to the consumer, thus dividing the expenses equally between consumers, each paying the same on this item of investment.

With this view of the matter, how ridiculous to attempt to legislate this inequality between consumers. How absurd to erect a structure that can but destroy the architect.

Why not legislate the price of coal, oil, flour, groceries, and other articles of prime necessity? I believe it cannot be successfully and truthfully controverted, that there is no associated capital in the United States that regard the wishes of those with whom they have business relations to that extent, as the Gas Companies.

F. G. H.

Niagara Falls, 12th January, 1866.

THE AMALA MINING COMPANY.

The entire property owned by this Company consists of two hundred and sixty claims, of one hundred feet each, or of twenty-six thousand feet, on well selected and defined lodes, mines, mining claims and privileges, lands and premises, situated in seventeen different mining districts in Clear Creek County, Colorado, together with a Ranch claim of forty acres, and the undivided two-thirds of nine hundred feet of water power on Grass Valley Bar, above claim No. 70, with a fall of about fifteen feet.

The eastern border of Clear Creek County, in which the property of the Company is situated, is about thirty miles west of Denver City. The county takes its name from a pure and never failing stream which has its sources high up in the Rocky Mountains, and, flowing eastward, passes along the northern part of the county, and empties into the South Platte, four miles below Denver.

Idaho, the capital of Olear Creek County, is on the 105½ degree west longitude, and about eighteen miles south of the 40th parallel of north latitude. It is situated on both sides of Clear Creek, about six miles south of Central City, in Gilpin County, and thirty-five miles west of Denver.

A majority of the claims owned by the Amala Mining Company are within about one mile of Clear Creek and its tributaries, between Idaho and Empire City.

The principle streams which are the tributaries to Clear Creek, within the county, are Soda Creek, Chicago Creek, Trail Creek or Run, Silver Creek, south fork of Clear Creek, and Brody Creek, coming from the south between the towns of Idaho and Empire City, ten miles west; from the north are Hiawatha, Fall River, Mill Creek, Lyon Creek, Bear Creek and Mud River. Along or near the banks of these streams are good natural roads, and the entire mining districts are abundantly supplied with wood and water sufficient for all practical purposes for years to come.

This is a very valuable mining property, and has been selected with great care, having in view the facility with which the claims can be worked, and the proximity to wood and water, so necessary to the economical working of mines. No county in Colorado is better wooded and watered than Clear Creek County.

Surface ores in this county assimilate to those in other sections of the country, and can be worked to advantage by the ordinary stamp mill process; but on reaching below the "cap rock," richer, but only pyritic ores, are found, from which not more than twenty to twenty-five per cent. of the gold can be extracted by the stamp mill process, although the ores will yield from fifty to two hundred dollars per ton by fire assays; consequently resort has been had to chemistry in many ways, to obtain a desulphurizing process which will give a yield of gold equal, or nearly so, to its assays.

The richness of the mines in the Districts of Idaho, Payne's Bar, Jackson, Morris, Trail Run, Banner, and Downieville are to well known to require particular comment.

The proposed route of the Union Pacific Railroad will probably be from Denver to Idaho, and up the valley of Clear Creek to Vasquez, or Berthoud Pass into Utah.

The Amala Mining Company has not yet been enabled to obtain a complete description of each claim owned by the company; but a general statement of the value of the property will be readily made from the report of Professor J. M. Tiernan, of Colorado, a gentleman well known in mining circles.

IMPORTANT NOTICE.

To ADVERTISERS.—Our paper offers a snperior medium as an advertising agent, to all those who manufacture or sell machinery or appliances of any kind for Gas, Mining, Water, Sewerage, the production or purification of Oils, &c. &c., not so much on account of a wide-spread circulation, as from the fact that it goes directly to the hands of those who are constantly using and requiring machines and improvements for these branches, and who look through our columns for information where to pro cure them. The class of people who read our paper not only peruse our pages of reading matter, but read the advertisements as well, for the reason that they are directly interested in all things pertaining to their business. We therefore ask, with confidence that we can do them justice, all parties having machinery or improvements of any kind for either of the objects to which our paper is devoted, to send in their advertisements and avail themselves of these advantages. It will be observed that our terms for advertisers are very reasonable.

NEW YORK, Feb, 1, 1866.

	Bid.	Asked		Bid.	Asked
Copper stock.			***Gold stock.***		
Aztec	7		Benton	1	1¼
Bedford	1	1	Consol'd Gregory		28¾
Boston	4½	5	Corydon	—	3
Caledonia, A. P.	10	12	Gunnel	3¾	4½
Canada	3¾	4	Great Western	—	8
Carp Lake	3	5	Hope	—	9
Central	—	—	Isaac's Harbor	¾	⅞
Columbian	—	24	Manhattan	—	9
Copper Falls		—	Mariposa	44	44¾
Clifton	—	$1	Montana	½	1
Dacotah	—	5½	New York	2½	3
Derby	⅞	1½	N. Y. & Nova Scotia	½	1¼
Douglass	—	—	Quartz Hill	9¾	10
Evergreen	18¾	20	Quicksilver M'g Co	81	82
Flint Steel River	12	13½	Rocky Mountain	—	10½
Frue	2¾	5	Smith & Parmelee	7	12
Grand Portage	—	—			
Hancock	12¾	14	***Coal Stocks.***		
Hamilton	—	6	American	98	100
Hilton	5	6	Ashburton	—	25
Hudson	1	2	Central	62	65
Huron	32	33	Cumberland	61	62
Indiana	8¾	9¼	Del. & Hud. Canal	206	208
Isle Royale			*Hampshire & Balt.	104	110
Keweenaw	—	6	Pennsylvania	213	215
Knowlton	7	10			
Lafayette	1	2	***Lead stocks.***		
Manhattan	—	—	Bucks County	⅝	⅞
Mendota	—	—	Clute	1⅛	1⅞
Merrimac	4¾	5½	Erie	—	20
Minnesota	33	37	Macomb	3¾	5
New York, A. P.	2	3½	Plancentia Bay	1¾	1¾
N. J. Consolidated	4	4¾	Sussex	¾	⅞
Norwich	—	6	Wallkill	3⅛	6
Ogima	5	6¾			
Ontonagon	3	4⅛	***Iron stocks.***		
Penn	—	11½	Copake	8	10
Providence	1⅛		French Creek	⅞	1
Quincy	96¾		Teal Lake	4½	6
Reliance	1¼				
Rockland	12⅜		***Miscellaneous.***		
Superior	8⅝		Rutland Marble	17	20
Sharon liquidated	—		* *Ex. div.*		

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Trains leave New York, from the foot of Chambers Street, N. R., via the Pavonia Ferry, at 7 a. m., for Buffalo, Canandaigua, Rochester and principal stations, and also for Cleveland, via the Atlantic & Great Western R. R. For Otisville and way stations (milk train, daily) at 8·30 a. m. Mail train for Buffalo and intermediate stations, 10 a. m. For Port Jervis, Newburgh, Warwic, and intermediate stations, 4 p. m. Night Express, for Dunkirk, Buffalo and principal stations, 5 p. m. Night Express, 6 p. m., daily for Dunkirk, Canandaigua Rochester and principal stations, and for Cleveland, via the Atlantic & Great Western R. R. Emigrant train for Dunkirk and Buffalo, 8 p. m. Freight Express, daily, for Dunkirk, 10 30 p. m. Trains leave for Patterson (daily), at 6·45, 7, 8·30, 9·15, 10 and 11·45 a. m.; 1·45, 3·45, 4, 4·30, 5, 5·30, 6·15, 8, and 10 30, (both daily) p. m. The word "daily" indicates that it runs Sunday,

CENTRAL OF NEW JERSEY.

Leave from pier No. 15 North River, (Liberty Street,) daily at 6 a. m. for Easton, Mauch Chunk, Williams port, Wilkesbarre, Mahanoy City, &c. Mail train at 8 a. m. for Flemington, Epston, Water Gap, Scranton, Wilkesbarre, Great Bend, Pittston, Binghampton, &c., 9 a. m. Western Express for Easton, Allentown, Harrisburgh, Pittsburgh, and the West, with but one change of cars to Cincinnati or Chicago, and but two changes to St. Louis. 12 m. for Easton, Allentown, Mauch Chunk, Reading, Pottsville, Harrisburgh, &c. 4 p. m. for Easton, Scranton, Great Bend, Bethlehem, and Mauch Chunk. 5 p. m. for Somerville and Flemington. 6 p. m. Express Train for the Oil Region and Erie, via Mauch Chunk and Williamsport, daily, except Saturdays. 6·30 p. m. for Somerville. 7 p. m. for Somerville. 8 p. m. Western Express for Easton, Allentown, Reading, Harrisburg, Pittsburg, and the West. Sleeping cars through from Jersey City to Pittsburg every evening.

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For Elizabeth, 6, 7, 8 10, and 10 a. m.; 1, 2, 3.20, 3.40, 4,10, 4.30, 5, 5,10, 5.40, 6.10, 7.10, 8.20, 10 and 12 p m.

For Rahway, 7, and 10 a. m. and 12, 2, 3.20, 4.10, 5.10, 5.40, 7.10, and 12 p. m.

For New Brunswick, 7, 8, 10, and 11.30 a. m.; 12 m. 4, 4,10, 5.10, 6, and 12 p. m.

For Millstone, at 8 a. m.; 2.15, and 4.10 p. m.

On Sundays trains leave New York for Philadelphia and intermeuiate stations at 6 p. m. and for Washington, 7,00 p. m.

Military tickets will not be received in the 8 a. m. or 7 p. m. trains.

RETURN TRAINS.

Leave Philadelphia at 1.15, 3.35, 8 and 11.15 a. m. and 2 50, 4.30, and 6 45, p. m. arriving in New York at 4.42, 7.02, 12.05, and 2.55, a. m. and at 6.22, 8.20, and 10.27 p. m.

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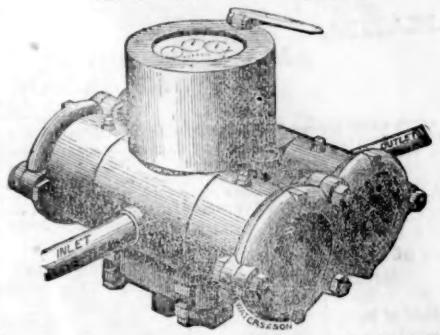

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600	02	150 00	30 00	180 00
750	39	188 00	35 00	225 00
1,000	61	250 00	42 00	292 00
1,200	48	300 00	45 00	345 00
1,400	50	350 00	50 00	400 00
1,600	52	400 00	54 00	454 00
1,800	55	450 00	60 00	510 00
2,000	58	500 00	62 00	562 00
2,500	60	625 00	72 00	697 00
3,000	63	750 00	85 00	835 00
3,500	66	875 00	87 00	962 00
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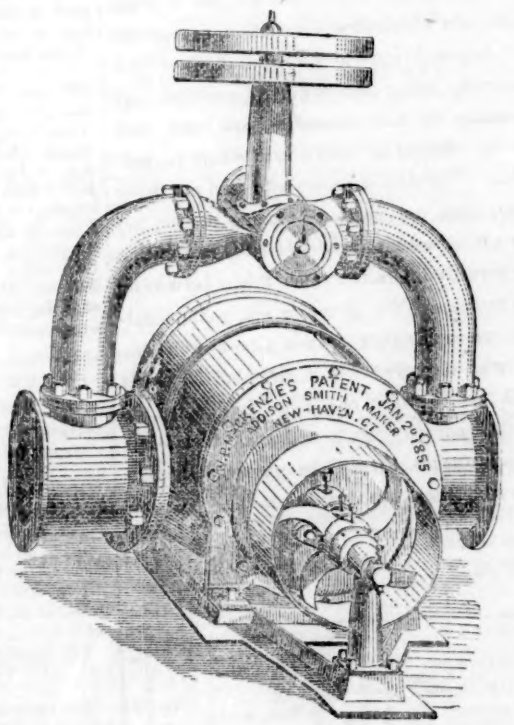

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69 Wall street. [$5,000,000.]
J. P. G. Foster, Pres. A. L. Purves, Sec.

RYND FARM PETROLEUM CO.,
8 Broad street, [$2,000,000.]
S. J. Macy, Pres. J. F. Jenkins, Sec.

SECOND NATIONAL PET. CO.,
100 Broadway. [$3,000,000.]
M. S. Frost, Prest. J M. Bruce, Jr., Tr

TARR FARM PETROLEUM CO,
61 Cedar street. [$3,000,000.]
J. Wadsworth, Pres. C. W. Ware, Sec.

UNITED REPUBLIC PET. CO.
74 Broadway. [$2,500,000.]
E. J. Lowber, Pres. J. H. Kidder, Secy.

UNITED PETROLEUM FARMS CO.
10 Pine street. [$10,000,000.]
G. H. Bissell, Pres. J. P. Hogarth, Sec.

VIRGINIA & OHIO PETROLEUM CO.
51 Broad street. [$1,000,000.]
B. Schieffelin, Pres. E. Siebeer, Sc.

WINONA PETROLEUM CO.
5 William street. [$1,000,000.]
J. N. Tappan, Pres. J. D. Fish, Treas.

EST VIRGINIA OIL & COAL CO.
roadway, [$3,000,000.]
Ball. Pres. F. A. Miller, Sc.

Great Improvement
IN
Sewing Machines.
EMPIRE
SHUTTLE MACHINE!

Patented February 14th, 1860.

Salesroom, 536 Broadway.

This Machine is constructed on entirely new principles of mechanism, possessing many rare and valuable improvements, having been examined by the most profound experts, and pronounced to be SIMPLICITY and PERFECTION COMBINED.

It has a straight needle, perpendicular action, makes the LOCK or SHUTTLE STITCH, which will NEITHER RIP nor RAVEL, and is alike on both sides; performs perfect sewing on every description of material, from Leather o the finest Nansook Muslin, with cotton, linen, or silk thread, from the coarsest to the finest numbert.

Having neither CAM nor COG WHEEL, and the least possible friction, it runs as smooth as glass, and is

Emphatically a Noiseless Machine!

PRICE OF MACHINES,
COMPLETE:

No. 1, Family Machine, with Hemmer, Feller, Gauge, Braider, & Corder, complete. - - - $60
No. 2. Small Manufacturing, with Extension Table, $75
No. 3. Large Manufacturing, with Extension Table, $85
No. 3. Large Manufacturing, for Leather, with Rolling Foot and Oil Cup, 100

One-half hour's instructions is sufficient to enable any person to work this Machine to their entire satisfaction.

Agents Wanted in all Towns in the United States, where Agents are not already established. Also, for Cuba, Mexico, Central and South America, to whom a liberal discount will be given
Terms, invariably CASH on delivery

T. J. McARTHUR & C[illegible],
536 Broadway.

WILCOX GIBBS SEWING MACHINE

It is entirely noiseless.
A patented device prevents it being turned backward.
The needle cannot be set wrong.
It received the Gold Medal of the American stitute in 1863.
InSend for a circular containing full information, notices from the press, testimonials from those using the machine, &c.

JAMES WILLCOX,
Manufacturer, 508 Broadway, New York
Principal Offices:
NEW YORK—508 Broadway.
BOSTON—323 Washington street.
PHILADELPHIA—720 Chestnut street.
CHICAGO—133 Lake street.
CINCINNATI—70 West 4th street.
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PARIS—82 Boulevard de Sebastopol.
ST. PETERSBURGH—15 Gorochovay.
VIENNA—9 Wildpretmarket.
BRUSSELS—12 Rue Croisade.
SYDNEY, AUSTRALIA—202 Pitt street

GAS-BURNERS.

T. G. ARNOLD,
MANUFACTURER OF
GAS-BURNERS
And Importer of SCOTCH TIPS,
224 and 226 West 21st street,
formerly No. 447 BROOME ST., New York.
Mercury Cups, Portable Sockets, Burner Pillars, Burner Pliers, &c., &c.

C. GEFRORER,
Manufacturer of
GAS-BURNERS,
For Lighting and Heating Purposes.
GAS HEATING AND COOKING APPARATUS; FITTERS' ROVING APPARATUS, &c.
529 Commerce st., bet. Market & Arch,
Philadelphia.

WOODEN PURIFYING TRAYS
PATENT
Conically Slotted Solid Wood Sieves
FOR PURIFIERS.

The Conically Slotted Solid Wood Tray or sieve was patented 21st October, 1862, and all persons are cautioned against purchasing them of any other person except the subscriber. The following companies are now using these trays.

Manhattan, New York,
Metropolitan,
New York
Albany,
Troy
Brooklyn, L.
Williamsburgh,
Citizens
Baltimore Md.
Louisville, Ky.
Chicago, Ill
Cambridge,
And numerous others

Orders received by mail or otherwise.
JOHN L. CHEESMAN.
147 Avenue C New York City

WEST'S IMPROVED PUMPS, the most Simple, Durable, and Powerful, and the Cheapest in use.
J. D. WEST & CO.,
No. 40 Cortland street,

JOSEPH LENNIG,
1615, 1617, and 1619 Francis St.,
Above Ridge Avenue, Philadelphia, Pa.,
MANUFACTURER OF
WET & DRY GAS METERS,
STATION, SHOW, & EXPERIMENTAL METERS,
Photometers, Pressure Registers, Indicators, and Gauges, Governors Meter Provers, Centre Seals, Fluid Gauges, &c.
GAS APPARATUS
Of the most reliable and approved construction manufactured and on hand at the
UNION GAS METER WORKS.

D. PARRISH, Jr.,
GAS ENGINEER
And Contractor for Coal or Oil Gas-Works.
Estimates given for Gas-Works, Gas-Holders, or any Gas Apparatus.
205 1-2 Walnut st., Philadelphia, Pa.
Box 1956, Post Office.

To Manufacturers of Petroleum Gas

For sale, Parrish's Patent Gas and Air Mixer, adapted to all works using Petroleum or other oils, by which rich Petroleum Gas is mixed, after it leaves the holder, with a proper proportion of air, giving it the greatest illuminating power, without smoke, through any burners. The apparatus being attached to the outlet pipe, requires no alteration of the works.

Apply at the Gas-Works of St. Nicholas Hotel, No. 63 Mercer st., N. Y., where one can be seen in operation; or address D. Parrish, Jr., St. Nicholas Hotel, New York city, or No. 1416 Arch street, Philadelphia.

TO GAS COMPANIES.

THE UNDERSIGNED DESIRES TO undertake the supervision of several small Gas-works, to visit and examine them as often as may be necessary; to obtain and inspect their coal, castings, fire-brick, and other materials; and to manage their general business in such a manner that they shall be under such supervision as is now attainable in large works, at much increased cost. Also, to advise as general Consulting Engineer and expert in practical chemistry.

CHAS. M. CRESSON,
Late Asst. Engineer of the Philadelphia Gas-works
417 Walnut st., Philadelphia.

THE AUBIN
GAS-WORKS COMPANY,
Of Albany, N. Y.,

Now contract their works to make 10,000 feet of good Gas from 2,000 pounds of *hard* wood and 40 gallons of kerosene tar, *before payment can be demanded;* and the charcoal is worth the cost of the wood.

Many Village Gas Companies can be referred to.

R. D. WOOD & CO.,
MANUFACTURERS OF
CAST-IRON PIPE, RETORTS, &c.
Office, 400 Chestnut street,
PHILADELPHIA.

Carrington & Co.'s
GENERAL
PURCHASING
AGENCY,
In Connection with all the Expresses
No. 30 Broadway,
NEW YORK.

Established 1854.

Purchases to order ANY article wanted from New York, (or from Europe,) for ladies' or gentlemen's use or wear,—comfort or luxury—from a cameo to a cashmere—a sea ring to a steam-engine.

Goods purchased at current City prices, and forwarded by Express, or as directed.

Commission, Five Per Cent.

Remittances, with orders, can be made by Express if preferred, as all Express Agents will take orders, receipt for and forward funds, and see to return of Goods.

SPECIAL CIRCULAR.

The Adams Express Company, appreciating the need of a capable medium connecting with the various Express Lines, through which personal and other orders for goods from this city, can be satisfactorily supplied, do recognize CARRINGTON & [illegible] GENERAL PURCHASING AGENCY as such a medium for filling orders for every description of goods wanted from New York, and commend it to the attention of the public, and of our general and local agents, recommending our agents to extend to it all reasonable aid, by facilitating the distribution of its cards and circulars, and making known the advantages it affords.

ADAMS EXPRESS CO.
By W. B. DINSMORE, Prest.
NEW YORK, June, 1864.

We cheerfully concur in the above recommendation of the Adams Express Company.
AMERICAN EXPRESS COMPANY,
By HENRY WELLS, Prest.
UNITED STATES EXPRESS COMPANY,
By D. N. BARNEY, Prest.
WELLS, FARGO & CO.,
NATIONAL EXPRESS COMPANY,
By J. A. ULLEN
HARNDEN EXPRESS,
By L. W. WINCHESTER, Supt.
KINSLEY & CO.'S EXPRESS,
By E. LITTLEFIELD, Supt.
HOPE EXPRESS COMPANY,
A. D. HOPE, Supt.
BREESE & CO.'S EXPRESS,
By STEPHEN BREESE, Supt
NEW JERSEY EXPRESS COMPANY,
By GEORGE R. DUNN, Sup

The Greatest Improvement yet in the Sewing Machine Art!

A CURIOSITY WORTH SEEING!

Please send for circular with sample of sewing.

These Improved Machines save ONE HUNDRED PER CENT. of thread and silk, and make the LOCK-STITCH alike on both sides.

They require no instruction to operate perfectly, except "the printed directions."

No change in sewing from one kind of goods to another.

And no taking apart to clean or oil.

Our NEW MANUFACTORY is now complete, with all its machinery and tools entirely new, and is already rapidly turning out Machines which for BEAUTY and PERFECTION of FINISH are not surpassed by any manufacture in the world.

N. B.—Should any Machine prove unsatisfactory, it can be returned and money refunded.

Agents wanted in counties not vassed by ur own agents.

Finkle & Lyon S. M. Co.
No. 538 BROADWAY, NEW

GROVESTEEN & CO.,

PIANO-FORTE MANUFACTURERS

499 BROADWAY, NEW YORK.

The attention of the public and the trade is invited to our New Scale Seven Octave Rosewood Piano-Fortes, which for volume and purity of one are unrivalled by any hitherto offered in this marked. They contain all the modern improvements, French, grand action, harp pedal, iron frame, over-strung bass, etc., and each instrument being made under the personal supervision of Mr. J. H. Grovesteen, who has had a practical experience of over thirty years in their manufacture, is fully warranted in every particular.

THE "GROVESTEEN PIANO-FORTE"

Received the highest award of merit over all others at the Celebrated World's Fair!

where were exhibited instruments from the best makers of London, Paris, Germany, Philadelphia, Baltimore, Boston, and New York; and also at the American Institute for five successive years, the gold and silver medals from both of which can be seen at our warerooms.

By the introduction of improvements we make a still more perfect Piano-Forte, and by manufacturing largely, with a strictly cash system, are enabled to offer these instruments at a price which will preclude all competition.

PRICES.

No. 1, Seven Octave, round corners, Rosewood Plain Case $275.
No. 2, Seven Octave, round corners, Rosewood Heavy Moulding, $300
No. 3, Seven Octave, round corners, Rosewood Louis XIV, style $325, a fac-simile of the accompaning cut.

TERMS—NET CASH, IN CURRENT FUNDS. Descriptive Circular sent free.

LILLIE'S
CELEBRATED
Chilled and Wrought Iron Safes,
WROUGHT IRON FIRE-PROOFS,
LOCKS AND VAULT DOORS.

These Fire-Proofs are manufactured to supply a demand for Security Against Fire, less expensive than my celebrated and superior Chilled and Wrought Iron Burglar and Fire-Proof Safes.

They furnish similar and equal security to the Safes generally manufactured in the different cities, but are SUPERIOR to them in their Fire-Proof qualities and durability, the iron being effectually protected from rust in any climate, and the Fire-proof not subject to lose its utility by age. This is an important advantage gained to the purchaser, as Safes often rust out and become worthless in two or three years.

To substantiate my position, those purchasing these Fire-Proofs are at liberty, by giving me due notice of time and place of trial, to test them by fire with any other Safe of the same size; and should they not prove superior, I will refund the money, or a new Fire-Proof, as the purchaser may decide.

LIST OF SIZES & PRICES OF WROUGHT IRON FIRE-PROOFS

No.	Outside. Height.	Width.	Depth.	Inside. Height.	Width.	Depth.	Price.
6	40	31	27	31	21	15	$150
5	34	21	26	24	21	14	125
4	31	27	25	22	18	13	110
3	30	24	24	21	15	12	100
2	28	22	23	20	14	12	75
1	24	19	20	17	11	10	50

Sample of Fire-Proof Safe at Office of the Am. Ad. Agency, 389 Broadway, N. Y.

PRICE LIST.
LILLIE'S CELEBRATED CHILLED & WROUGHT IRON SAFES.

BANK, FIRE, AND BURGLAR SAFES.
Folding Doors, D Lock.

No.	Outside. Height.	Width.	Depth.	Inside. Height.	Width.	Depth.	Price.
	In.	In.	In.	In.	In.	In.	
1	66	50	29	54⅛	39	18	$950
1½	59	50	26	48	39	15	800
2	53	44	27	42⅛	33	15	600

MERCANTILE F AND B SAFES.
Folding Doors and Monitor Locks.

3	50	42	27	40	32	16	$500
4	46	42	27	36	32	16	450
4½	38	46	27	28	36	16	450
5	42	38	27	31⅛	27½	15	350

Single Doors and M. Lock.

6	38	35	26	27⅝	23½	15	$250
7	34	31	26	24	21	14	200
8	31	28	24	21	18	13	175
9	30	24	24	21	15	12	140
10	26	22	22	19⅛	13½	12	120
11	24	20	18	17	17	10	100

HOUSE SAFES

SIDE BOARD	$300
DINING ROOM	350
PANTRY (No. 1)	275
PANTRY (No. 2)	150
DUODECAGON BANK LOCK	100
MONITOR SAFE do.	50
SAFE do.	10

NATIONAL BANK SAFES,
With 2 Inside Burglars and 1 D and 2 M Locks.

No.	Outside. Height.	Inside. Hei	Width.	Depth.	Price.
	In.	In.	In.	In.	
1	68	55	39	18	$1,200
2	61	48	39	18	1,050
3	57	42½	33	18	900

BANK VAULT BURGLAR SAFES,
With Folding Doors and D Lock.

0	68	53	27	64	48	20	$1,000
0½	61	53	27	55	46	20	800
1	57	47	27	49	40	20	600

BANK VAULT BURGLAR SAFES,
Single Doors and D Lock.

2	53	32	26	49	28		
	42	36	22	38	32	19	
4	36	31	20	32	27		0
5	30	24	18	26	20	14	

BANK VAULT DOORS AND FRAMES,
D and S Lock.

No.	Height clear.	Width clear.	Depth adjustable.	Price.	Weight
	In.	In.	In.		
1	72	27	20	$400	3,000
2	72	27	20	275	1,500

Orders received and filled at net cash prices, by the AME[illegible]DVERTISING CY, 389 Broadway, New York. All Safes shipped from Troy fr[illegible] of cartage
[illegible] E. ALVORD [illegible] CUTLER

WEST'S IMPROVED PUMP.
Anti-Freezing, Double-Acting, Forcing, and Lifting

These Pumps have now been in general use a number of years, and give better satisfaction than any other, and are recommended as

THE BEST!

by CAPTAIN ERICSSON and other eminent engineers. We can refer to thousands using them, a guarantee that all will recommend them. They are more simple in construction, and work easie and cost less than all others.

"Our readers will find the double acting, improved pump of J. D. West & Co., one of the best the market. It is very simple, works to a charm, so that any child may use it; throws a steadcontinuous stream, and does not freeze in the coldest exposures, and is unusually cheap. We sathis knowingly, and give the testimony of our own accord, without the knowledge or request of the proprietor"—*New York Evening Post, July 1st*, 1863.

"J. D. WEST & Co.: We are pleased to state that the Pumps we had of you about a year ago, have been in constant use, twelve hours each day, and raise for the use of our woolen factory, about 130 gallons per minute. They work with but little power, compared with pumps we have used before, and do not get out of repair, and are satisfactory in all respects.

"DUNLAP MANUFACTURING CO."

Solon Robinson to the Farmers' Club.

Jan. 28.

"No farmer who owns a well or cistern can possibly afford to be without an iron pump. It should be a once a suction and force pump—a perfect little fire engine—such a one known as 'West's Improved Pump.' I speak of this Pump because I happen to know it....to be very simple, durable, powerful and cheap, and it don't freeze up, nor get out of order once a year....I know this, and think I may be doing the farmers good by speaking of it....A boy ten years old can work it, and throw a continuous inch-and-a-quarter stream....It can be made to work in deep wells as well as in shallow ones."

"The undersigned having to use "West's Improved Pumps," cheerfully recommend them as simple, durable, and powerful in raising and throwing water, and for their ease of action, security against frost, and low price, we believe them superior to all others.

"WARREN LELAND, Met. Hotel, N. Y.
"J. W. POMEROY, Yonkers, N. Y.
"JOHN MESSEREAU, N. Y.
"DOMINICK LAWRENCE, Westchester."

From the New York Observer.

"We have had in use for months past one of West's Pumps, which has given us more satisfaction as a force and lifting pump than any we have ever used. It is one of great power, and well adapted for ship's decks, mines, factories, greenhouses, graperies, etc. *The Mining Chronicle and Railway Journal* says: 'It is recommended for its extreme simplicity of construction, great strength, and consequent durability and cheapness of repair. There is no stuffing-box—the pressure being held by a cup packing, like that upon the working-piston, working in a cylinder, fitted for the purpose within the upper air chamber—which we think a great improvement, as stuffing is so liable to be deranged and leak under strong pressure, to say nothing of the loss by friction incident thereto. It has also two air-chambers; thus the action of the valve is cushioned upon both sides by air—preventing water-hammer and vacuum-thump. The valves are very accessible and simply and cheaply repaired. They work much easier than any pump we have ever seen; the 4-inch cylinder being worked by children in wells 100 feet deep, and as they are extremely cheap, as well as simple and strong, we freely recommend them.'"

"CAMBRIDGE MINE, N. C., June 15, 1863.

"J. D. WEST & Co.—Gents: The Pump which I ordered for our mine is received, and put to work in our underlay shaft, which we are sinking. We find that one man will, with ease, lift 50 gallons per minute. We lifted in three and a half hours all the water in the shaft, which measures seven by twelve feet and thirty feet deep, and it was full when we commenced. It answers our expectations in every respect, and our workmen are highly pleased with it. It will do great service with but trifling expense for repairs.

"Yours, respectfully, BURR HIGGINS."

"This may certify, that I have been using, at my manufactory, for the last four years, 'West's Improved Pumps.' I now have in use three of said Pumps, one of which is kept constantly at work, 24 hours of each day (save Sunday, and has been running for the past two years. I pronounce them, unhesitatingly, the best Pumps that have been brought to my notice, having used many other previously. They are simple in their construction, and not easily disarranged.

"N. Y., Oct. 10, 1859. JAS. A. WEBB."

We have plenty more such certificates, but think these are enough. For Pumps, Hose, Pipe, etc., address or call upon

J. D. WEST & CO., 40 Cortlandt st., New York.

Orders may be sent through the American Advertising Agency, 389 Broadway.

EDDY'S

Kerosene Cooking & Heating

STOVES AND RANGES.

THESE COOKING STOVES WILL

☞ *Bake, Boil, Stew, Fry and Roast,*

With the greatest economy and facility, and without heating the room in which they are used. They are perfectly simple, operating like an ordinary Kerosene Lamp with a chimney, and are the only Kerosene Stoves that burn without smoke or odor.

"We have been perfectly astonished to see what a labor-saving, dirt saving and heat-saving institution is Eddy's PATENT KEROSENE STOVE. Taking the cost of running it, and the result attained, it is the best patent in the market."—*Worcester Daily Spy.*

Our Heating and Cooking Stoves are very convenient and economical, especially where a fire is required but a few hours at a time.

Orders for Stoves may be sent through American Advertising Agency, 389 Broadway, New York.

LESLEY & ELLIOT,

Manufacturers, No. 494 Broadway, New York.

Send for Illustrated Circular. (136

KNITTING MACHINES

FOR

Families and Manufacturers,

☞ *Something New and Invaluable for Family Use.*

We offer the public the simplest, strongest and best Knitting Machine in the world.

It occupies but little space—is portable and can be attached to a stand or table, weighs about 40 lbs.

It will knit a variety of Stitches—the breakage of needles is trifling—the cost of needles is insignificant and the most delicate material can be knit pure and spotless, as the needles are not oiled.

Orders for Machines may be sent through the American Advertising Agency,

389 Broadway, N. Y.

Send for a Circular—Agents wanted

DALTON KNITTING MACHINE CO.,

137] 537 Broadway, N. Y.

WEED'S

HIGHEST PREMIUM

Shuttle Sewing Machine

Has only to be seen and operated to be Appreciated.

Call and see for yourself before purchasing. Please bring samples of various kinds of thread, (such as is usually found at stores,) and various kinds of fabric, which you know the former most popular Sewing Machines either cannot work at all, or, at best very imperfectly.

SUPERIORITY.

over any other Machine in the market will be seen at a glance.

1st. It runs easily and rapidly, and is so constructed as to endure all kinds of hard usage.

2d. No breaking of threads in going over seams.

3d. No imperfect action of the feed at uneven places in the work.

4th. The Weed-stitch catches of itself, and will sew from the finest lace to the heaviest leather, and 20 cotton to coarse linen thread.

5th. The Weed Machine will do beautiful quilting on the bare wadding, without using inner lining; thus leaving it soft as if done by hand.

6th. The variety of fancy work that can be done on the

WEED MACHINE,

with so little trouble, makes it equal, if not superior, to six machines combined; for instance, it Binds, Hems, Tucks and Sews on the band at the same time, and in face, the

WEED NO. 2 MACHINE,

as before stated, is equivalent to a combination of any six ordinary machines.

Orders for Machines may be sent through the American Advertising Agency 389 Broadway, N. Y.

Below we give a few prices:

No. 2. Oil Black Walnut, Ornamented with Hemmer.	$60,00
No. 2. Oil Black Walnut, Hall Case, Ornamented, with Hemmer.	65,00
No. 2. Extra Oil Polished Black Walnut, Half Case, Large Table beautifully Ornamented.	75,00

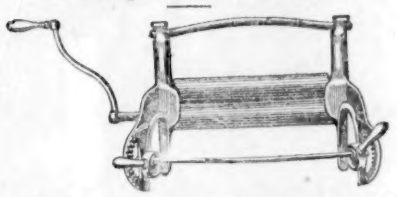
WEED SEWING MACAINE Co.,

136) 505 Broadway, New York

PUTNAM'S CLOTHES WRINGER.

IT IS THE ONLY RELIABLE

Self-Adjusting Wringer.



No Wood-work to Swell or Split. No Thumbscrews to get out of order. Warranted with or without Cog wheels.

It took the First Premium at Fifty-seven State and County Fairs in 1863, and nearly double that number in 1864, and is, without an exception, the *best* Wringer ever made. Patented in the United States, England, Canada, and Australia. Agents wanted in every town, and in all parts of the world. Energetic agents can make from $8 to $10 per day.

WHAT EVERYBODY KNOWS, VIZ.:

That Iron well galvanized *will not rust.*

That a *simple* machine is better than a complicated one.

That a Wringer should be *self-adjusting, durable, and efficient.*

That thumb-screws and fastenings cause *delay* and *trouble* to regulate and keep in order.

That wood soaked in water will *swell, shrink,* and *split.*

That wood-bearings for the shaft to run in *will wear out.*

That the Putnam Wringer, with or without cog wheels, will *not tear the clothes.*

That cog-wheel regulators are not essential.

That the Putnam Wringer has *all* the advantages, and *not one* of the disadvantages above named.

That all who have tried it pronounce it the *best* Wringer ever made.

That it will wring a thread or a bed-quilt *without alteration.*

We might fill the paper with testimonials, but insert only a few to convince the skeptical, if such there be; and we say to all, *test* Putnam's Wringer. Test it *thoroughly* with *any* and any others, and if not entirely satisfactory, return it;

PUTNAM MANUFACTURING CO.—*Gentlemen:* I know from practical experience that iron well galvanized with zinc will not oxydize or rust one particle. The Putnam Wringer is as near perfect as possible, and I can cheerfully recommend it to be the best in use. Respectfully yours,

JOHN W. WHEELER, Cleveland, O.

Many years' experience in the galvanizing business enables me to indorse the above statement in *all particulars.*

JOHN C. LEFFERTS, No. 100 Beekman St.

NEW YORK, *January,* 1864.—We have tested Putnam's Clothes Wringer by practical working, and know that it will do. It is cheap; it is simple; it requires no room, whether at work or at rest; a child can operate it; it does its duty thoroughly; it saves time, and it saves wear and tear. We earnestly advise all who have *much* washing to do, with all intelligent persons who have *any,* to buy this Wringer. It will pay for itself in a year at most. HORACE GREELEY.

PRICES—$8, $9, and $10.

Sample Wringers sent, express paid, on receipt of price.

Manufactured and sold, wholesale and retail, by

PUTNAM MANUF'G CO.,

18 PLATT STREET, New York,
BENNINGTON, Vt.,
CLEVELAND O.

WATER AND GAS PIPE.

The Boston Bituminized Pipe Company,

Are now manufacturing and prepared to take orders, for their PATENT PIPE, (from 2 to 12 inches in diamter,) as a substitute for Iron, Copper, Lead, &c., for the conveyance of WATER, GAS, SEWERAGE, &c. &c.

From the testimonials received, and the entire satisfaction it has given those having it in use, we feel warranted in claiming for this pipe over that of any other, the following advantages, viz:

It is much CHEAPER—has great strength (it having been tested to 500 lbs. to the square inch,) combined with LIGHTNESS, costing less for transportation; the joints are easily made and perfectly tight; it does not expand or contract from different degrees of temperature, and is free from *CORROSION* or *CONCRETIONS* forming; does not impart any taste or injurious properties to water, and as far as anything can be said to be indestructible, we deem this to be.

As a GAS PIPE, we say it has no superior. The Lowell Gas Light Co., purchased and laid some of this Pipe last year, and have likewise subjected samples to a test of four month's duration in their dry lime purifiers, with the most satisfactory results, in fact establishing beyond a doubt, its perfect adaptation to the wants and requirements of Gas Companies. specimens of which, together with the statement of S. Cushing, Esq., Agent Lowell Gas Light Co., who made these experiments. I shall be pleased to show, and give all other needed information, by applying in person, or by letter, to JOHN L. WEBSTER, Treas.,

Boston Bituminized Pipe Co.,
No. 2 Pearl st. House, Boston.

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AMBROSE SPENCER GILCHRIST.

(LATE CAPT. U. S. V.,)

CIVIL, MINING

AND ARCHITECTURAL ENGINEER,

No. 200 BROADWAY, Office 12.

New York.

H. P. GENGEMBRE'S

PATENT

Non Freezing and Non Evaporating

METER FLUID,

☞ Far cheaper than any other in use.

For Filling Wet Gas Meters, cheaper, in the long run, than water.

Seven years of success!

Six years in general use in works using it, to the exclusion of all other fluid, and driving the dry meter out of use, enables us to recommend the patent with perfect confidence.

For information and purchase of rights, apply to

A. DOISEY, Esq., Sole Agent,

Box 2,180, Cincinnati, Ohio, or to

H. P. GENGEMBRE, Pittsburgh, Pa.

The privilege of using the Patent has been granted in the following cities.

Allegheny City, Pa.; Leavenworth, Kansas; St. Louis, Mo.; Chillicothe, O; New York, N. Y.; Washington, Pa; Greenbush, N. Y.; Ottawa, N; Y.; Detroit, Mich.; Hannibal, Mich.; Linn, Mass.; Lansinburg, N. Y.; Rock Island, Ill.; Burlington, Iowa; Mount Vernon, O; Troy, N. Y.; Galena, Ill. Pittsburgh, Pa.; Ithica, N. Y.; Akron, O.; New Castle, Pa.; Portsmouth, O; Brooklyn, N. Y.: Mansfield, O.; Steubenville, O.; Fort Wayne, Ind.; Peoria, Ill.; Wooster, O.; Bellefonte, Pa.; Kalamazoo, Mich.; Seneca Falls, N. Y.; Birmingham, Pa.; Saratoga Springs, N. Y.; Salem, O.; Dubuque, Iowa; Newark, O.; Wheeling, Va.; Jersey City, N.J. Quincy, Ill.; Piqua, O.; and others. [141

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New York, April 18th, 1864.

We respectfully invite your attention to and consideration of the justly celebrated and reliable remedy for DYSPEPSIA, HEARTBURN, DEBILITY and PROSTRATION. The Proprietors are proud to acknowledge the unparalleled success which has attended the sale of their valuable preparation, known in nearly every portion of the civilized world as the

"GOLDEN BITTERS."

We risk nothing when we term them a *valuable preparation,* for they are one of the few articles of the present day which are not a humbug; and we are willing and able to satisfy any person or persons who will call upon us, that the celebrated "GOLDEN BITTERS" are a genuine *bona-fide hygienic* article. It is the wish of the proprietors that the virtue of the article be tested before condemning. A decision of their merits by any one who has tried them, is worth a million of purchased bogus testimonials.

For Creating a Healthy Appetite

they are invaluable, and are unequalled as a TONIC. They are mild in their action, and operate by giving *vigor* and *strength* to the system,—not by any change they produce in the solids, but through the medium of the living principle.

They are Purely Vegetable,

being composed of Gentian Root, Calamus, Sassafras, and many other remedial agents of the Vegetable world, all preserved in Jamaica Rum and Sherry Wine.

As a Beverage,

They are the most *wholesome, invigorating* and *palatable* stimulant ever offered to the public. And the fact of their being prepared chemically and scientifically, precludes the possibility of a bitter, unpleasant taste, common to Bitters generally offered for sale. We especially recommend them to LADIES, and particularly to those suffering from

DEBILITY, WEAKNESS, AND PROSTRATION.

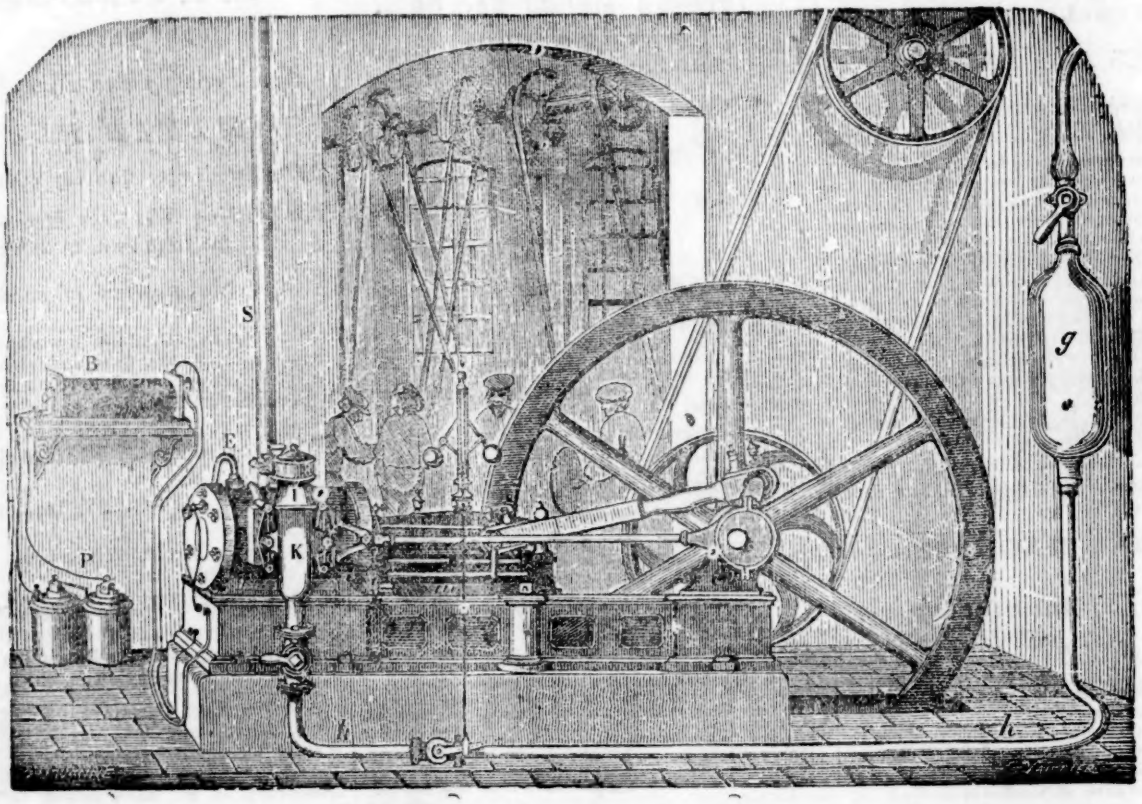
Half a wine glass of these "Bitters" three or four times a day, will produce a remarkable healthy change in persons greatly debilitated.

The "Golden Bitters" have been tried and not found wanting. They are put up in our own *Patent* quart bottles, and for sale by Druggists, Grocers, &c., throughout the world. Each bottle bears a fac-simile of the signature of Hubbel & Co.

GEO. C. HUBBEL & Co., Sole Proprietors

CENTRAL DEPOT, American Exp. Building, New York.

THE GOLDEN BITTERS.—We are not an advocate of stimulants or an alcoholic character; indeed we deprecate this "daily tonic" idea—this "morning toddy" which we see offered in all sorts of shapes as a recuperator, invigorator, revitalizer, &c. As a rule all artificial stimulants are dangerous remedies, and must be taken into the system as you would mercury or arsenic, in very small doses. But we have had an opportunity to try the now well-advertised article known as Hubbel's Golden Bitters, and are frank to say that where the system needs building up, where a stimulant is required to aid nature in restoring a lost appetite and infusing a vigorous action to the debilitated functions, we can recommend these Bitters. Hubbel's Golden Bitters are evidently intended to improve the debilitated human system, rather than to tickle the palate, and are, therefore a harmless and safe remedy keep in the house.—*New York Weekly Day Book.*



MOTEUR—LENOIR.

LENOIR GAS ENGINE.

This is a horizontal engine, in which a piston, by a connecting rod drives a horizontal shaft.

The gas enters by the pipe "h" from the regulating reservoir "g," (made of vulcanized india rubber,) which regulates the feeding and the branches connected with the gas-pipe.

The tube, K, receives the gas conveyed by the pipe "h," and conducts it to the valve, which opens and closes alternately, by means of a rod moved by an eccentric wheel fastened to the end of the shaft.

Two of Bunsen's piles, P, sufficient to produce the electricity are placed at a little distanc from, and in communication with a Ruhmkorff electric apparatus, B. The electric current of this apparatus is conducted by means of insulated wires to the electricity distributor "m," placed on the front of the frame, while the current of electricity and its arrival at the inflammator, inserted at each end of the cylinder, is directed by the movement of the piston-rod, which, by an ingenious combination, impels a small movable slide before the distributor.

The burnt gas, after having performed its functions in the machine, escapes, by means of a valve, through a pipe, S, and the water designed to cool the interior of the cylinder enters through a double passage, by means of a pipe situated near the escape-valve, and goes out by the pipe, E.

A two horse and a half horse Engine are now in practical operation at the Dry Dock Iron Works, No. 435 East Tenth street, near East River, New York, where they are being manufactured, and those interested are invited to call and examine them.

THE LENOIR GAS ENGINE

Requires no Fire and makes no Smoke,

No Noise, no Dirt, and is thoroughly safe.

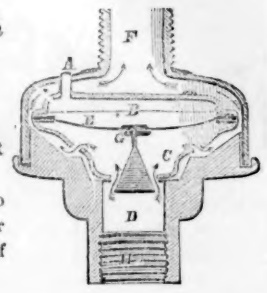
It is propelled by the expansion of Air, dilated by the combustion of Gas within the cylinder, ignited by the

ELECTRIC SPARK

NOTICE TO GAS COMPANIES AND GAS CONSUMERS

THOMPSON'S PATENT GAS CONTROLLER,

The only Self-Acting Gas Controller, Regulator, and Burner Combined which has ever been invented, or known to science.



THE PRINCIPLE UPON WHICH THE THOMPSON'S AUTOMATIC GAS CONTROLLER works is one well known to mechanics, and is simple in its operation.

Within the circumference of a small cylinder below the burner is placed a conical valve attached to a movable diaphragm. The diaphragm rises or falls as the pressure of gas from the pipe is lesser or greater, and the valve acts upon the valve-seat with such regularity of movement that in a difference of rom five-tenths of an inch pressure to five inches the variation in flame is hardly perceptible.

The simplicity of its machinery and the nature of the material used in its construction insure its regular action and durability.

In consequence of the uniform quantity of gas which passes the Controller to the burner, there is no waste, and a steady, soft flame is produced, which is important to all who read, write, or work by gas light. The unsteady flickering blaze which invariably exists when the pressure of gas is beyond the requisition for consumption, has injured the sight of thousands who have been subjected to it.

For street lamps these Controllers are especially valuable, because the pressure varies materially during the night, and in consequence there is a waste of gas, and the light variable.

Improvements have lately been made in the mechanism of the Controller which makes them almost a perfect meter to each burner, and they are now offered to the public with more confidence than ever before.

Reference is permitted to the following named gentlemen—

Col. CHAS. ROOME, President Manhattan Gas Company, N. Y.
C. H. SAND , Esq., President Metropolitan Gas Company, "
J. H. ADAM, Esq., President New York Gas Company, "
PETER COOPER, Esq., Cooper Institute, "
JOHN A. DUFF, Esq., Olympic Theatre, "

GEO. H. KITCHEN, Inspector of Gas Meters, N. Y
A. L. BOGART, Esq., Gas Engineer.
Col. J. A. SABATTON, Engineer Manhattan Gas Company.
Col. A. J. WHITE, Engineer Metropolitan Gas Company.
J. K. SIMPSON, Esq., Engineer Cooper Institute.

Persons interested are invited to call at the Office, 111 Pearl street, where they can see the operation by pressure guage and test meters

M. L CALL NDAR, Agent
Office, 111 PEARL STREET.

THE AMERICAN METER CO.

Organized under the General Manufacturing Laws of the State of New York.

SAMUEL DOWN, PRESIDENT. HENRY CARTWRIGHT, VICE PRESIDENT. RICHARD MERRIFIELD, SECRETARY AND TREASURER

TRUSTEES.

SAMUEL DOWN. WILLIAM HOPPER, R. H. GRATZ. HENRY CARTWRIGHT, RICHARD MERRIFIELD.
THOMAS C. HOPPER, *Superintendent at Philadelphia.*

This Company is now prepared to furnish WET AND DRY GAS METERS, STATION METERS, GOVERNORS, PRESSURE INDICATORS & REGISTERS, SERVICE and METER COCKS, and all other articles in their line appertaining to the use of Gas-Works.

The combination of Mechanical and Scientific Skill, and the long experience of the several members of the Company, is a sure guarantee of durability, accuracy and excellence of workmanship. Orders addressed

AMERICAN METER COMPANY,

512 West Twenty Second Street, New York. Arch and Twenty Second Streets, Philadelphia. No. 23 West Street, Boston will meet with prompt attention.

Harris & Brother, Practical Gas Meter Manufacturers,

Continue, as heretofore, at their old Establishment, No. 1117 CHERRY ST., PHILADELPHIA, to Manufacture WET AND DRY GAS METERS, and all kinds of GAS APPARATUS, and furnish all articles appertaining to the use of Gas Works. ☞OUR WORK WARRANTED—Satisfaction Guaranteed. Orders respectfully solicited, and promptly attended to, by

HARRIS & BRO., No 1117 Cherry st., Phila

Messrs. Harris & Brother, Philadelphia Gas Works, February 14, 1857.

Dear Sirs;—I take great pleasure in stating that we have found your meters to register with entire correctness, and to be generally of very good quality; the number furnished by you to these works is over 5,000. JOHN C CRESSON, Engineer.

Office of the Gas Light Company of Augusta, Ga., March 6th, 1858.

This is to certify that having used meters manufactured by Messrs. Harris & Bro., for the last nine years, we do not hesitate to state they have given entire satisfaction in point of workmanship and accuracy of registration; they are surpassed by none, and equaled by few manufactories in the Union; we have used meters made by other establishments, but our preference is in favor of those made by Harris & Bro., of Philadelphia, Pa.

G S. HOOKEY, Superintendent of the Gas Light Company of Augusta, Ga.

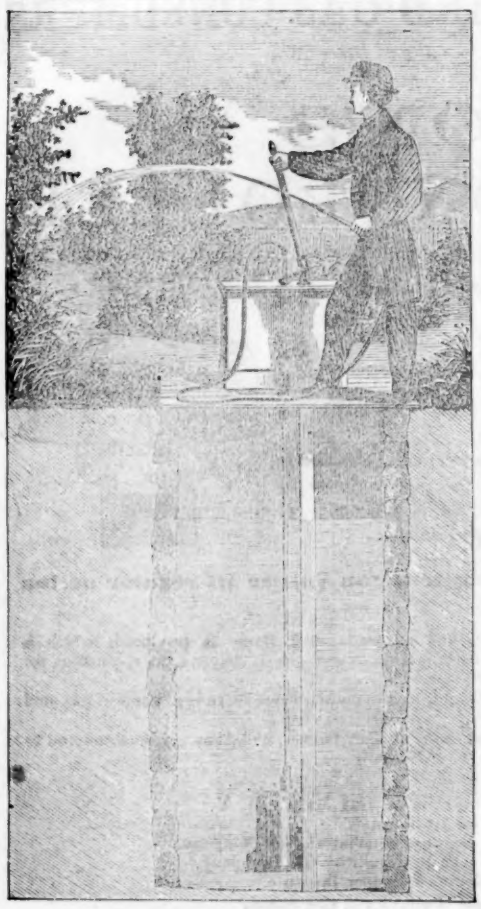
Messrs. Harris & Bro., Philadelphia. Philadelphia, March 4, 1858.

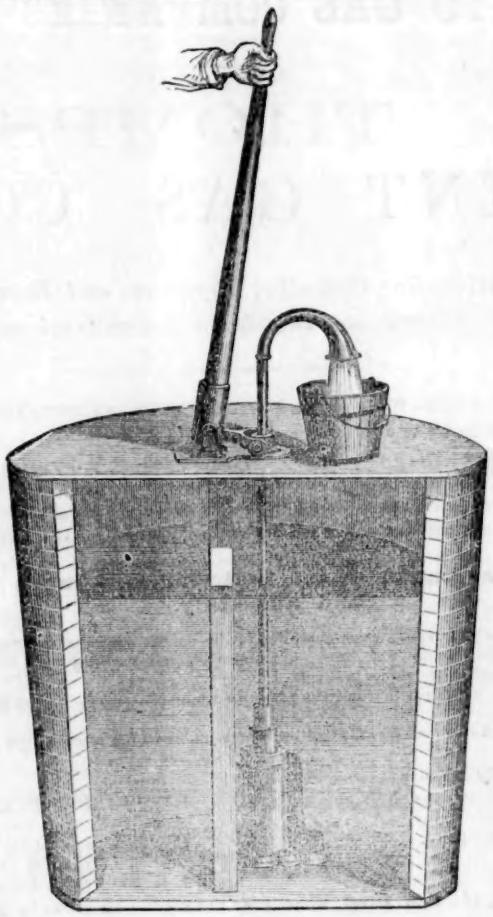
Gentlemen—We take great pleasure in bearing our testimony to the very superior character of the meters we have received from your establishment. We have always found the workmanship all we could desire, while the accuracy and reliability of their measurement have always been satisfactory. We have used meters made by other parties, and none have given as entire satisfaction as those received from you. We are gentlemen, very truly yours, PETERSENI & MEARS.

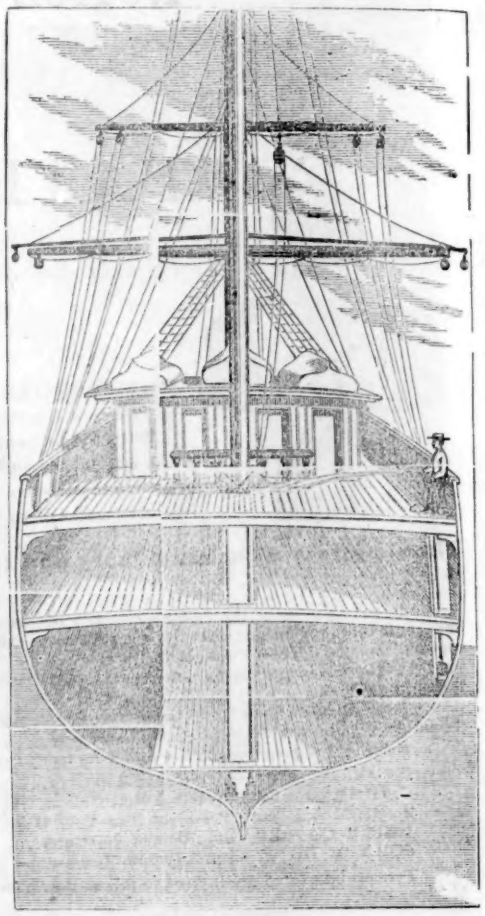
Messrs. Harris & Bro. March 14, 1857.

Gentlemen—For the last ten years we have used in the Philadelphia Gas Works meters made in your factory and take pleasure in expressing my opinion to their correctness. On several occasions I have taken your meters apart, and found the materials used in the manufacture of the same to be as fine quality as used in those imported from Europe, or made by any of the manufacturers in the United States. Respectfully Yours, GEORGE W

Inspector of Gas Fittings, Philadelphia







THE AMERICAN SUBMERGED PUMP,

OWNED BY THE AMERICAN PUMP MANUFACTURING CO., NEW YORK.

OFFICE, No. 40 DEY STREET.

ITS ADVANTAGES.

This valuable Invention, now first introduced, will, it is believed, supersede all others for any purpose in use at the present time.

FIRST.—SIMPLICITY. The entire pump is composed of but six parts, all of cast-iron, which can be put together by any mechanic.

SECOND.—DURABILITY. From the fact that it is always submerged, it is perfectly lubricated, and requires no packing. As no water can remain in the pipe when not in motion, there is no danger of freezing.

THIRD.—CAPACITY. It is contended that, for the power applied, this Pump excels all others. The No. 1 (the smallest size,) of this Pump, with the power of one hand, has a capacity of thirty gallons per minute, and will throw a stream seventy feet in the air.

FOURTH.—CHEAPNESS. For economy, this Pump surpasses all others, its first cost being about one-third less than that of other Pumps of the same capacity, and being much less both in size and weight, there is a great saving in transportation.

ITS USES.

FIRST.—For a House Pump; the smallest size of the patent Submerged Pump is sufficient for all family purposes. Placed in a well or cistern, water may be conveyed to every room in a common sized house.

SECOND.—For a Farm Pump; for all purposes connected with irrigating, watering stock, etc., etc. This Pump can be placed in running streams, ponds, bayous, etc., and water conveyed to any required distance.

THIRD.—For a Ship Pump; Any ship owner or captain, with short experience in the use of this Pump, will give his unqualified approval for ship purposes, either to be used as a bilge pump simply, or for washing decks, etc. From its simplicity, as a bilge Pump it will be found entirely free from choking, and will clear grain, dirt, stones, etc., with ease.

FOURTH.—For a Factory Pump, or for air in Oil Wells, for Breweries, or for pumping acids, hot liquors, etc., it is invaluable. It cannot be affected by any liquid.

FIFTH.—To all Directors and Officers connected with mining interests, the PATENT SUBMEAGED PUMP presents great advantages.

The experience of the last five years have clearly proved at what great expense both in first cost and freight, it has been necessary to be at to secure the proper means of expelling water from the mines, quarries, etc. With this Pump an immense saving is effected in both instances, as in first cost it is much less than other Pumps of the same capacity and power.

Its principle is that of a Double-acting Force Pump, with a heavy double-acting piston cast in one piece, and a double-acting iron valve within the same, without the use of leather valves or any packing whatever.

RECOMMENDATIONS.

Office of the American Ship Building Company, New York, Oct. 21, 1864.

I am very much pleased with the economy and simplicity of the American Pump, which I have examined with much interest. IT IS ADMIRABLY ADAPTED FOR SHIP PURPOSES, and from its GREAT POWER it would do incalculable service in the event of LEAKAGE. It also works well in pumping, where the cargo consists of grain in bulk, and is free in its action.

AUGUSTUS WALKER, Marine Constructor.

New York, October 26, 1864.

To the American Pump Manufacturing Co.:

I have examined with much interest the working and results of the Double Action Force Pump which you are introducing in the market. For use as a Ship Pump and for Mining purposes, I consider it of great value, the results far exceeding anything of the kind presented to my observation, particularly for its GREAT POWER and SIMPLICITY. It will give me pleasure to recommend its introduction into the Navy. Please deliver as soon as possible the Pumps ordered by me last week, for the Mines of the Middlefield Fire and Building Stone Company of Massachusetts, and oblige, Yours, respectfully, CHARLES B. STUART, Consulting Engineer, U. S. N.

Office of the Neptune Iron Works, New York, February 6, 1865.

the American Pump Manufacturing Co.:

I was very much impressed in examining the Pump manufactured by your Company. The originality of the design is in good keeping with its simplicity of construction—certainly very desirable qualities in all mechanical combinations. The extensive demand is the best proof of the popularity and favor it is receiving from the public. I have no hesitancy in recommending it to the inspection of those wishing THE BEST PUMP in the country.

CHARLES HUBBARD, Jr.,
Superintendent.

Office of Donald McKay,
East Boston, Aug. 15, 1865.

Alvin Walker, Esq., Sec. American Submerged Pump Co

DEAR SIR:—In answer to your request for my opinion of your Patent Submerged Pump, will say, that for simplicity, compactness and durability, it has the appearance of being the BEST mechanical combination I have seen, having fitness combined with its simplicity, making it SUPERIOR to Pumps now generally used for general purposes on land. Also, well suited as a Ship Deck Pump, and, in my opinion, can be arranged to be readily used as a good Bilge Pump for Ships.

Yours truly,
HRMAN WINTER

CAMP PAROLE, ANNAPOLIS, Md., April 22, 1865.

Wm. Numson, Esq., President, Baltimore:

DEAR SIR,—The No. 2 Pump has been properly adjusted, and works to our entire satisfaction. Hoping you may be successful in introducing it to the public, we remain,

Very respectfully, yours, &c.,
JONES & CROWLEY.

(Letter from the President of Board of Common Council, City of Boston)

Boston, August 10, 1865.

A. Walker, Esq., Sec. American Submerged Pump Co.—

Dear Sir—In reply to your request for the results of the trial of one of your Pumps, I will briefly state the purpose for which it was needed, and the complete satisfaction attained. It was desired to clean out a well 42 feet in depth, in which there stood 10 feet of water; I had previously vainly tried several methods, in one of which one large Force Pump and as many buckets as could be used, succeeded in 10 hours in reducing the depth of the water to 3 feet, but beyond that nothing could be gained. I then put in one of your smallest Pumps, which drained the well completely in Six Hours; although the spring which fed the well yielded a stream of water about as large as a man's arm. I need not say that I consider the Pump fully capable of accomplishing what you claim for it. Yours truly, W. B. [illegible]

I can fully endorse the above statement. GE

FEB. 17, 1866.